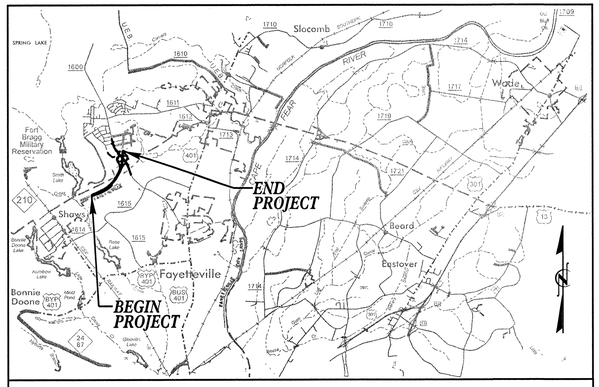
TIP PROJECT: X-0002CA

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY

METRIC

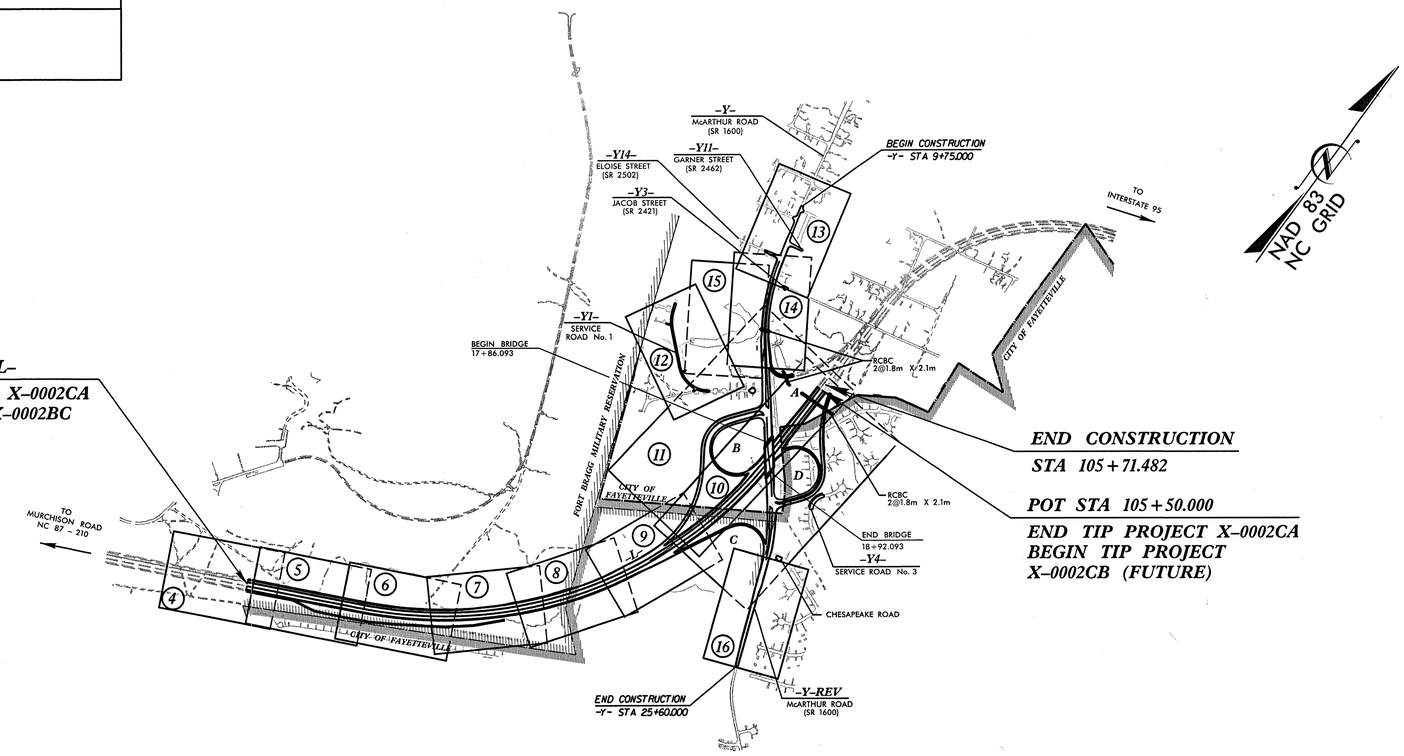
ALL DIMENSIONS IN THESE PLANS ARE IN METERS UNLESS OTHERWISE SHOWN

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	X-0002CA	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
35196.1.2	NHF-DPR-0100(002)	P.E.
35196.2.4		ROW & UTIL
35196.3.19	NHF-0100(19)	CONST.

LOCATION: ***FAYETTEVILLE OUTER LOOP***
FROM 1.3 KM EAST OF NC87-NC210 (MURCHISON RD.)
TO EAST OF SR1600 (MCARTHUR RD.)

TYPE OF WORK: ***GRADING, DRAINAGE, PAVING, STRUCTURES AND SIGNING***



POT STA 83+40.000 -L-
BEGIN TIP PROJECT X-0002CA
END TIP PROJECT X-0002BC

THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS LIMITED TO INTERCHANGES

PART 2 OF 2

GRAPHIC SCALES

5 0 10
PLANS

5 0 10
PROFILE (HORIZONTAL)

1 0 2
PROFILE (VERTICAL)

DESIGN DATA

ADT 2011	=	38,100
ADT 2036	=	66,390
DHV	=	9 %
D	=	55 %
T	=	10 % *
V	=	110 km/h

* (TTST 4 % DUAL 6 %)
FUNC. CLASS = INTERSTATE

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT X-0002CA	=	2.210 km
LENGTH STRUCTURES TIP PROJECT X-0002CA	=	0.000 km
TOTAL LENGTH OF TIP PROJECT X-0002CA	=	2.210 km

Prepared In the Office of:
MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC License Number F-0105
FOR THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

2006 METRIC STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MAY 31, 2006

LETTING DATE:
FEBRUARY 15, 2011

T.R. REID, P.E.
PROJECT ENGINEER

T.E. HUFFMAN, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SDG
Sungate Design Group, P.A.
Engineering - Landscape Architecture - Environmental
915-A Jones Franklin Rd.
Raleigh, N.C. 27606
NC License Number C-0890
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, III
SIGNATURE: P.E. 11/24/10

ROADWAY DESIGN ENGINEER
MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC License Number F-0105
NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID
SIGNATURE: P.E. 11/24/10

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION
P.E.
STATE HIGHWAY DESIGN ENGINEER

11/24/2010
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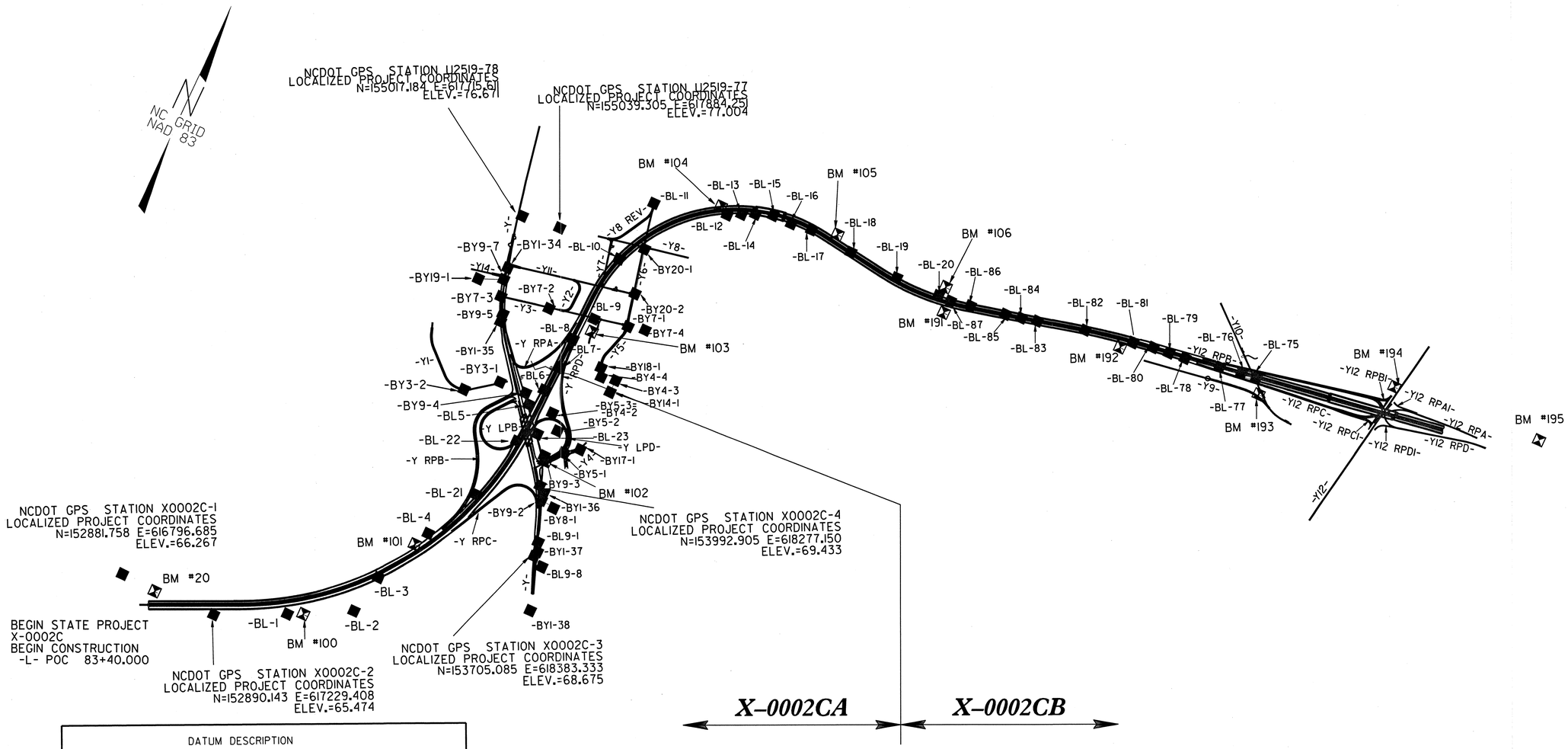
PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	1-A
LOCATION AND SURVEYS	

SURVEY CONTROL SHEET X-0002-C



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "X2D8"

WITH NAD 83 STATE PLANE GRID COORDINATES OF

NORTHING: 154807.5364(m) EASTING: 625333.9514(m)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: .999874791

THE N.C. LAMBERT GRID BEARING

LOCALIZED HORIZONTAL GROUND DISTANCE FROM

"X2D8" TO -L- STATION 83+40.000 IS

8,612.975M S76°35'17.10"W

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES

VERTICAL DATUM USED IS NAD83/NGVD 29

NOTES:

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/
THE FILES TO BE FOUND ARE AS FOLLOWS:
X0002C_LS_CONTROL_080409.TXT
SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
◎ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

6/2/99

6/3/2010
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6/2/99

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	1-B
LOCATION AND SURVEYS	

SURVEY CONTROL SHEET X-0002C

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
221	X-0002C BL-1	153027.9550	617518.1380	68.519	89+34.799	54.651 RT
222	X-0002C BL-2	153162.0960	617774.1650	69.664	92+03.327	109.502 RT
223	X-0002C BL-3	153338.6530	617809.7330	67.282	93+50.311	15.087 RT
224	X-0002C BL-4	153601.3180	617925.1530	69.576	96+35.218	36.965 LT
225	X-0002C BL-21	153841.1010	618042.9810	69.926	99+07.945	20.763 LT
226	X-0002C BL-22	154125.4670	618104.1850	70.771	102+03.121	15.360 LT
227	X-0002C BL-23	154191.3950	618172.5270	69.420	102+72.469	48.686 RT
228	X-0002C BL-5	154291.8750	618084.0280	66.726	103+69.965	42.604 LT
229	X-0002C BL-6	154376.7820	618117.6800	65.322	104+55.713	11.156 LT
230	X-0002C BL-7	154494.6380	618135.8430	61.666	105+73.999	3.956 RT
231	X-0002C BL-8	154627.8050	618140.1530	68.852	107+07.233	4.824 RT
232	X-0002C BL-9	154746.0840	618184.6640	70.548	108+26.622	46.265 RT
233	X-0002C BL-10	155026.0440	618174.5150	72.715	111+08.424	3.432 LT
234	X-0002C BL-11	155308.8490	618209.6430	75.444	113+54.312	110.904 LT
235	X-0002C BL-12	155397.0900	618520.0950	70.914	116+33.890	21.721 RT
236	X-0002C BL-13	155426.1360	618576.0920	68.426	116+98.879	19.627 RT
237	X-0002C BL-14	155451.8620	618629.9950	62.003	117+59.860	14.257 RT
238	X-0002C BL-15	155479.1990	618701.8460	56.191	118+37.457	6.020 RT
239	X-0002C BL-16	155479.9970	618788.2120	67.248	119+24.604	17.192 RT
240	X-0002C BL-17	155492.8000	618879.0720	68.841	120+17.145	5.304 RT
241	X-0002C BL-18	155476.3760	619074.9750	74.984	122+13.941	3.026 LT
242	X-0002C BL-19	155459.1860	619302.1520	72.637	124+42.477	14.638 LT
243	X-0002C BL-20	155466.5160	619497.9190	77.302	126+41.535	16.498 LT
244	X-0002C BL-87	155467.7290	619554.7350	75.170	126+98.608	9.368 LT
245	X-0002C BL-86	155486.0830	619642.5920	70.633	127+88.998	8.738 LT
246	X-0002C BL-85	155517.8760	619795.7000	62.572	129+45.271	2.670 LT
247	X-0002C BL-84	155532.6340	619865.4490	56.791	130+16.521	0.167 LT
248	X-0002C BL-83	155549.4980	619933.5830	66.305	130+86.711	0.098 LT
249	X-0002C BL-82	155600.3560	620138.8360	67.147	132+98.168	0.280 LT
250	X0002C BL-81	155639.8880	620348.7000	63.067	135+11.810	2.702 RT
251	X-0002C BL-80	155657.4360	620437.8480	47.967	136+02.641	0.256 LT
252	X-0002C BL-79	155665.4590	620509.5360	45.768	136+74.694	3.193 RT
253	X-0002C BL-78	155673.9290	620582.3550	50.128	137+47.935	6.379 RT
254	X-0002C BL-77	155703.4810	620734.5430	55.796	139+02.883	1.338 RT
255	X-0002C BL-76	155720.3250	620831.2760	54.614	140+01.063	0.049 RT
256	X-0002C BL-75	155731.3940	620898.3520	54.969	140+69.046	0.241 LT

BY3

POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
81	X-0002C -BY3-2	154230.8270	617802.8230	70.155	11+93.698	0.336 RT
80	X-0002C -BY3-1	154326.3570	617931.0370	69.378	10+33.197	4.378 RT

BY4

POINT	DESC.	NORTH	EAST	ELEVATION	Y_RPD STATION	OFFSET
61	X0002C BY4-2 BY	154301.0570	618193.9770	66.425	3+15.867	46.490 RT
62	X0002C BY4-1	154462.8870	618273.7900	60.125	2+05.962	103.989 LT
63	X-0002C BY4-4	154531.9422	618319.6203	65.572	1+24.033	167.134 LT
64	X-0002C BY4-3	154543.5956	618381.7302	67.462	1+21.988	230.320 LT

BY5

POINT	DESC.	NORTH	EAST	ELEVATION	Y_RPD STATION	OFFSET
60	X-0002C BL-6	154376.7820	618117.6800	65.322	2+25.121	73.389 RT
61	X0002C BY4-2 BY	154301.0570	618193.9770	66.425	3+15.867	46.490 RT
65	X0002C BY5-2	154240.6380	618246.1390	68.806	3+92.968	46.123 RT
66	X0002C BY5-1	154164.3770	618310.1720	68.516	5+07.186	3.967 LT

BY7

POINT	DESC.	NORTH	EAST	ELEVATION	Y3 STATION	OFFSET
83	X0002C BY7-3	154663.7945	617778.0739	72.716	OUTSIDE PROJECT LIMITS	
84	X0002C BY7-2	154705.0330	617988.9540	73.650	12+06.783	4.530 RT
86	X0002C BY7-1	154778.3289	618333.2704	69.976	15+58.814	3.868 RT
87	X0002C BY7-4	154795.9380	618405.9584	69.318	OUTSIDE PROJECT LIMITS	

BY9

POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
260	X0002C BY9-7	154734.1257	617758.5159	74.783	11+75.961	6.234 RT
261	X0002C BY7-3	154663.7945	617778.0739	72.716	12+48.900	5.485 RT
262	X0002C BY9-5	154599.5530	617817.4720	68.648	13+23.874	5.481 LT
263	NOT SET	154382.1311	618005.8933	UNKNOWN	16+12.555	6.882 LT
264	X0002C BY9-4	154329.9860	618051.0830	66.670	16+81.555	6.335 LT
265	X0002C BL-5	154291.8750	618084.0280	66.726	17+31.929	5.873 LT
266	X0002C BL-23	154191.3950	618172.5270	69.420	18+65.801	5.900 LT
267	X0002C BY9-3	154117.4600	618239.6290	69.605	19+63.990	11.921 LT
268	X0002C BY9-2	153937.4540	618310.6720	69.174	21+55.652	6.321 LT
269	X0002C BY9-1	153769.2440	618373.3240	69.284	23+35.150	6.458 LT
270	X0002C BY9-8	153689.5952	618402.9063	68.403	24+20.115	6.444 LT

BY14

POINT	DESC.	NORTH	EAST	ELEVATION	Y_RPD STATION	OFFSET
90	X0002C BY4-3	154543.5956	618381.7302	67.462	1+21.988	230.320 LT
91	X0002C BY14-1	154488.2170	618382.4710	64.548	2+41.231	213.646 LT

BY8

POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
88	X0002C BY9-2	153937.4540	618310.6720	69.174	21+55.652	6.321 LT
89	X0002C BY8-1	153932.0414	618372.1412	69.223	21+82.136	62.055 LT

BY17

POINT	DESC.	NORTH	EAST	ELEVATION	Y4 STATION	OFFSET
92	X0002C BY5-1	154164.3770	618310.1720	68.516	10+49.381	22.743 LT
93	X0002C BY17-1	154208.2126	618369.7152	65.764	11+10.162	5.186 RT

BY18

POINT	DESC.	NORTH	EAST	ELEVATION	Y5 STATION	OFFSET
94	X0002C BY18-1	154568.3770	618302.0450	66.384	10+50.767	1.669 LT
95	X0002C BY4-4	154531.9422	618319.6203	65.572	10+10.640	6.174 LT

BY19

POINT	DESC.	NORTH	EAST	ELEVATION	Y14 STATION	OFFSET
96	X0002C BY9-7	154734.1257	617758.5159	74.783	10+05.657	12.603 LT
97	X0002C BY19-1	154690.8794	617657.3666	74.758	11+13.621	33.704 LT

BY20

POINT	DESC.	NORTH	EAST	ELEVATION	Y6 STATION	OFFSET
280	X0002C BL-11	155308.8490	618209.6430	75.444	OUTSIDE PROJECT LIMITS	
281	X0002C BY20-1	155111.6092	618257.3029	72.564	13+37.864	5.911 RT
282	X0002C BY20-2	154919.7181	618300.9054	71.313	11+41.081	5.739 RT

NEWBY1

POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
BY134	BY1-34	154764.5650	617751.0250	75.339	11+44.644	5.776 RT
BY135	BY1-35	154564.9790	617822.3020	67.127	13+54.584	11.127 RT
229	X-0002C BL-6	154376.7820	618117.6800	65.322	16+90.447	87.242 LT
BY136	BY1-36	153968.8710	618305.8770	69.383	21+24.532	12.770 LT
BY137	BY1-37	153729.2330	618388.1250	68.942	23+77.811	6.395 LT
BY138	BY1-38	153486.7710	618464.8900	68.597	26+30.510	9.902 RT

DATUM DESCRIPTION
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "X2D8"
WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 154807.5364(m) EASTING: 625333.9514(m)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: .99987479I
THE N.C. LAMBERT GRID BEARING
LOCALIZED HORIZONTAL GROUND DISTANCE FROM "X2D8" TO -L- STATION 83+40.000 IS
8,612.975M S76°35'17.10"W
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAD83/NGVD 29

BM20 ELEVATION = 60.576
N 152874 E 616955
L STATION 83+66 59 LEFT
NAIL IN BASE OF 10 INCH PINE

BM100 ELEVATION = 70.518
N 153057 E 617581
L STATION 90+00 66 RIGHT
R/R SPIKE IN BASE OF 450MM PINE TREE

BM101 ELEVATION = 68.906
N 153533 E 617892
L STATION 95+58 31 LEFT
R/R SPIKE IN BASE OF 450MM PINE TREE

BM102 ELEVATION = 69.784
N 154100 E 618257
L STATION 101+92 139 RIGHT
R/R SPIKE IN BASE OF 375MM PINE TREE

BM103 ELEVATION = 70.457
N 154692 E 618200
L STATION 107+73 63 RIGHT
R/R SPIKE IN BASE OF 250MM CHERRY TREE

BM104 ELEVATION = 67.299
N 155419 E 618479
L STATION 116+09 17 LEFT
R/R SPIKE IN BASE OF 200MM PINE TREE

BM105 ELEVATION = 74.413
N 155522 E 618990
L STATION 121+24 36 LEFT
R/R SPIKE IN BASE OF 450MM PINE TREE

BM106 ELEVATION = 77.036
N 155513 E 619512
L STATION 126+62 61 LEFT
R/R SPIKE IN BASE OF 450MM PINE TREE

BM191 ELEVATION = 75.618
N 155410 E 619550
L STATION 126+85 47 RIGHT
3 NAILS IN BASE OF 430MM PINE TREE

BM192 ELEVATION = 64.147
N 155598 E 620307
L STATION 134+63 37 RIGHT
3 NAILS IN BASE OF 320MM PINE TREE

BM193 ELEVATION = 47.780
N 155666 E 620938
L STATION 140+98 71 RIGHT
3 NAILS IN BASE OF 500MM PINE TREE

BM194 ELEVATION = 35.131
N 155945 E 621458
L STATION 146+55 122 LEFT
3 NAILS IN BASE OF 600MM PINE TREE

BM195 ELEVATION = 34.466
N 155892 E 622909
L STATION 159+03
N 64° 46' 10.6" E DIST 217.925
3 NAILS IN BASE OF 250MM PINE TREE

NOTES:

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAY/LOCATION/PROJECT/
THE FILES TO BE FOUND ARE AS FOLLOWS:
X0002C_LS_CONTROL_080409.TXT
SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
⊘ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

6/3/2010
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cpowell

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	1-C
LOCATION AND SURVEYS	

SURVEY CONTROL SHEET X-0002C

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
221	X-0002C BL-1	153027.9550	617518.1380	68.519	89+34.799	54.651 RT
222	X-0002C BL-2	153162.0960	617774.1650	69.664	92+03.327	109.502 RT
223	X-0002C BL-3	153338.6530	617809.7330	67.282	93+50.311	15.087 RT
224	X-0002C BL-4	153601.3160	617925.1530	69.576	96+35.218	36.965 LT
225	X-0002C BL-21	153841.1010	618042.9810	69.926	99+07.945	20.763 LT
226	X-0002C BL-22	154125.4670	618104.1850	70.771	102+03.121	15.360 LT
227	X-0002C BL-23	154191.3950	618172.5270	69.420	102+72.469	48.686 RT
228	X-0002C BL-5	154291.8750	618084.0280	66.726	103+69.965	42.604 LT
229	X-0002C BL-6	154376.7820	618117.6800	65.322	104+55.713	11.156 LT
230	X-0002C BL-7	154494.6380	618135.8430	61.666	105+73.999	3.956 RT
231	X-0002C BL-8	154627.8050	618140.1530	68.852	107+07.233	4.824 RT
232	X-0002C BL-9	154746.0840	618184.6640	70.548	108+26.622	46.265 RT
233	X-0002C BL-10	155026.0440	618174.5150	72.715	111+08.424	3.432 LT
234	X-0002C BL-11	155308.8490	618209.6430	75.444	113+54.312	110.904 LT
235	X-0002C BL-12	155397.0900	618520.0950	70.914	116+33.898	21.721 RT
236	X-0002C BL-13	155426.1360	618576.0920	68.426	116+98.879	19.627 RT
237	X-0002C BL-14	155451.8620	618629.9950	62.003	117+59.860	14.257 RT
238	X-0002C BL-15	155479.1990	618701.8460	56.191	118+37.457	6.020 RT
239	X-0002C BL-16	155479.9970	618788.2120	67.248	119+24.604	17.192 RT
240	X-0002C BL-17	155492.8000	618879.0720	68.841	120+17.145	5.304 RT
241	X-0002C BL-18	155476.3760	619074.9750	74.984	122+13.941	3.026 LT
242	X-0002C BL-19	155459.1860	619302.1520	72.637	124+42.477	14.638 LT
243	X-0002C BL-20	155466.5160	619497.9190	77.302	126+41.535	16.498 LT
244	X-0002C BL-87	155467.7290	619554.7350	75.170	126+98.608	9.368 LT
245	X-0002C BL-86	155486.0830	619642.5920	70.633	127+88.998	9.738 LT
246	X-0002C BL-85	155517.8760	619795.7000	62.572	129+45.271	2.670 LT
247	X-0002C BL-84	155532.6340	619865.4490	56.791	130+16.521	0.167 LT
248	X-0002C BL-83	155549.4980	619933.5830	66.305	130+86.711	0.098 LT
249	X-0002C BL-82	155600.3560	620138.8360	67.147	132+98.168	0.280 LT
250	X0002C BL-81	155639.8880	620348.7000	63.067	135+11.810	2.702 RT
251	X-0002C BL-80	155657.4360	620437.8480	47.967	136+02.641	0.256 LT
252	X-0002C BL-79	155665.4590	620509.5360	45.768	136+74.694	3.193 RT
253	X-0002C BL-78	155673.9290	620582.9550	50.128	137+47.935	6.379 RT
254	X-0002C BL-77	155703.4810	620734.5430	55.796	139+02.883	1.338 RT
255	X-0002C BL-76	155720.3250	620831.2760	54.614	140+01.063	0.049 RT
256	X-0002C BL-75	155731.3940	620898.3520	54.969	140+65.046	0.241 LT

X2BY2

POINT	DESC.	NORTH	EAST	ELEVATION	Y2B STATION	OFFSET
BY24	X0002C -BY24	154940.9320	616747.2380	78.291	0+47.359	5.250 LT
BY25	X0002C-BY25	154787.5460	616912.2800	77.538	1+19.703	5.564 LT
BY26	X0002C-BY26	154578.4850	617100.6990	77.795	1+18.134	10.732 LT
BY27	X0002C-BY27	154285.8410	617221.1840	73.751	4+34.007	3.790 RT
BY28	X0002C-BY28	154037.0570	617342.9910	70.410	2+03.158	5.639 LT
BY29	X0002C-BY29	153757.9800	617451.6800	67.878	5+02.313	7.199 LT
BY30	X0002C-BY30	153537.1430	617332.8630	71.291	2+61.435	116.098 RT
BY31	X0002C-BY31	153415.3620	617103.9150	69.573	6+91.923	145.206 RT
BY32	X0002C-BY32	153256.3160	616926.4380	68.733	0+71.087	39.413 LT
BY33	X0002C-BY33	153155.6750	616759.9180	66.367	2+85.326	10.006 RT

BY3

POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
81	X-0002C -BY3-2	154230.8270	617802.8230	70.155	11+93.698	0.336 RT
80	X-0002C -BY3-1	154326.3570	617931.0370	69.378	10+33.197	4.378 RT

BY4

POINT	DESC.	NORTH	EAST	ELEVATION	Y_RPD STATION	OFFSET
61	X0002C BY4-2 BY	154301.0570	618193.9770	66.425	3+15.867	46.490 RT
62	X0002C BY4-1	154462.8870	618273.7900	68.125	2+05.962	103.989 LT
63	X-0002C BY4-4	154531.9422	618319.6203	65.572	1+24.033	167.134 LT
64	X-0002C BY4-3	154543.5956	618381.7302	67.462	1+21.988	230.320 LT

BY5

POINT	DESC.	NORTH	EAST	ELEVATION	Y_RPD STATION	OFFSET
60	X-0002C BL-6	154376.7820	618117.6800	65.322	2+25.121	73.389 RT
61	X0002C BY4-2 BY	154301.0570	618193.9770	66.425	3+15.867	46.490 RT
65	X0002C BY5-2	154240.6380	618246.1390	68.806	3+92.968	46.123 RT
66	X0002C BY5-1	154164.3770	618310.1720	68.516	5+07.186	3.967 LT

BY7

POINT	DESC.	NORTH	EAST	ELEVATION	Y3 STATION	OFFSET
83	X0002C BY7-3	154663.7945	617778.0739	72.716	OUTSIDE PROJECT LIMITS	
84	X0002C BY7-2	154705.0330	617988.9540	73.650	12+86.783	4.530 RT
86	X0002C BY7-1	154778.3289	618333.2704	69.976	15+58.814	3.868 RT
87	X0002C BY7-4	154795.9380	618405.9584	69.318	OUTSIDE PROJECT LIMITS	

BY9

POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
260	X0002C BY9-7	154734.1257	617758.5159	74.783	11+75.961	6.234 RT
261	X0002C BY7-3	154663.7945	617778.0739	72.716	12+48.900	5.485 RT
262	X0002C BY9-5	154599.5530	617817.4720	68.648	13+23.874	5.481 LT
263	NOT SET	154382.1311	618005.8933	UNKNOWN	16+12.555	6.882 LT
264	X0002C BY9-4	154329.9860	618051.0830	66.670	16+81.555	6.335 LT
265	X0002C BL-5	154291.8750	618084.0280	66.726	17+31.929	5.873 LT
266	X0002C BL-23	154191.3950	618172.5270	69.420	18+65.801	5.900 LT
267	X0002C BY9-3	154117.4600	618239.6290	69.605	19+63.990	11.921 LT
268	X0002C BY9-2	153937.4540	618310.6720	69.174	21+55.652	6.321 LT
269	X0002C BY9-1	153769.2440	618373.3240	69.284	23+35.150	6.458 LT
270	X0002C BY9-8	153689.5952	618402.9063	68.403	24+20.115	6.444 LT

BY14

POINT	DESC.	NORTH	EAST	ELEVATION	Y_RPD STATION	OFFSET
90	X0002C BY4-3	154543.5956	618381.7302	67.462	1+21.988	230.320 LT
91	X0002C BY14-1	154488.2170	618382.4710	64.548	2+41.231	213.646 LT

BY8

POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
88	X0002C BY9-2	153937.4540	618310.6720	69.174	21+55.652	6.321 LT
89	X0002C BY8-1	153932.0414	618372.1412	69.223	21+82.136	62.055 LT

BY17

POINT	DESC.	NORTH	EAST	ELEVATION	Y4 STATION	OFFSET
92	X0002C BY5-1	154164.3770	618310.1720	68.516	10+49.381	22.743 LT
93	X0002C BY17-1	154208.2126	618369.7152	65.764	11+10.162	5.186 RT

BY18

POINT	DESC.	NORTH	EAST	ELEVATION	Y5 STATION	OFFSET
94	X0002C BY18-1	154568.3770	618302.0450	66.384	10+50.767	1.669 LT
95	X0002C BY4-4	154531.9422	618319.6203	65.572	10+10.640	6.174 LT

BY19

POINT	DESC.	NORTH	EAST	ELEVATION	Y14 STATION	OFFSET
96	X0002C BY9-7	154734.1257	617758.5159	74.783	10+05.657	12.603 LT
97	X0002C BY19-1	154690.8794	617657.3666	74.758	11+13.621	33.704 LT

BY20

POINT	DESC.	NORTH	EAST	ELEVATION	Y6 STATION	OFFSET
280	X0002C BL-11	155308.8490	618209.6430	75.444	OUTSIDE PROJECT LIMITS	
281	X0002C BY20-1	155111.6092	618257.3029	72.564	13+37.864	5.911 RT
282	X0002C BY20-2	154919.7181	618300.9054	71.313	11+41.081	5.739 RT

NEWBY1

POINT	DESC.	NORTH	EAST	ELEVATION	Y STATION	OFFSET
BY134	BY1-34	154764.5650	617751.0250	75.339	11+44.644	5.776 RT
BY135	BY1-35	154564.9790	617822.3020	67.127	13+54.584	11.127 RT
229	X-0002C BL-6	154376.7820	618117.6800	65.322	16+90.447	87.242 LT
BY136	BY1-36	153968.8710	618305.8770	69.383	21+24.532	12.770 LT
BY137	BY1-37	153729.2330	618388.1250	68.942	23+77.811	6.395 LT
BY138	BY1-38	153486.7710	618464.8900	68.597	26+30.510	9.902 RT

DATUM DESCRIPTION
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT
IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY
NCDOT FOR MONUMENT "X2D8"
WITH NAD 83 STATE PLANE GRID COORDINATES OF
NORTHING: 154807.5364(m) EASTING: 625333.9514(m)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: .99987479
THE N.C. LAMBERT GRID BEARING
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"X2D8" TO -L- STATION 83+40.000 IS
8,612.975M S76°35'17.10"W
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAD83/NGVD 29

BM20 ELEVATION - 60.576
N 152874 E 616955
L STATION 83+66 59 LEFT
NAIL IN BASE OF 10 INCH PINE

BM100 ELEVATION - 70.518
N 153057 E 617581
L STATION 90+00 66 RIGHT
R/R SPIKE IN BASE OF 450MM PINE TREE

BM101 ELEVATION - 68.906
N 153533 E 617892
L STATION 95+58 31 LEFT
R/R SPIKE IN BASE OF 450MM PINE TREE

BM102 ELEVATION - 69.784
N 154100 E 618257
L STATION 101+92 139 RIGHT
R/R SPIKE IN BASE OF 375MM PINE TREE

BM103 ELEVATION - 70.457
N 154692 E 618200
L STATION 107+73 63 RIGHT
R/R SPIKE IN BASE OF 250MM CHERRY TREE

BM104 ELEVATION - 67.299
N 155419 E 618479
L STATION 116+09 17 LEFT
R/R SPIKE IN BASE OF 200MM PINE TREE

BM105 ELEVATION - 74.413
N 155522 E 618990
L STATION 121+24 36 LEFT
R/R SPIKE IN BASE OF 450MM PINE TREE

BM106 ELEVATION - 77.036
N 155513 E 619512
L STATION 126+62 61 LEFT
R/R SPIKE IN BASE OF 450MM PINE TREE

BM191 ELEVATION - 75.618
N 155410 E 619550
L STATION 126+85 47 RIGHT
3 NAILS IN BASE OF 430MM PINE TREE

BM192 ELEVATION - 64.147
N 155598 E 620307
L STATION 134+63 37 RIGHT
3 NAILS IN BASE OF 320MM PINE TREE

BM193 ELEVATION - 47.780
N 155666 E 620938
L STATION 140+98 71 RIGHT
3 NAILS IN BASE OF 500MM PINE TREE

BM194 ELEVATION - 35.131
N 155945 E 621458
L STATION 146+55 122 LEFT
3 NAILS IN BASE OF 600MM PINE TREE

BM195 ELEVATION - 34.466
N 155892 E 622909
L STATION 159+03
N 64° 46' 10.6" E DIST 217.925
3 NAILS IN BASE OF 250MM PINE TREE

NOTES:

1. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCT/HIGHWAYLOCATION/PROJECT/
THE FILES TO BE FOUND ARE AS FOLLOWS:
X0002C_LS_CONTROL_060129.TXT
SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

◎ INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
NETWORK ESTABLISHED FROM EXISTING HARN MONUMENTATION
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

6/2/99

6/3/2010
R:\Roadway\proj\x0002c_ls_1C.dgn
cpowell

PROJ. REFERENCE NO.	SHEET NO.
X-0002CA	1-D

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CENTERLINE COORDINATE LIST

Point #	Chain	Station	Northing (Y)	Easting (X)
1	L	83+00.000	152792.8156	616919.6356
2	L	83+40.000	152809.7529	616955.8727
3	L	83+80.000	152826.6902	616992.1098
4	L	84+20.000	152843.6275	617028.3470
5	L	84+60.000	152860.5647	617064.5841
6	L	85+00.000	152877.5020	617100.8212
7	L	85+40.000	152894.4393	617137.0583
8	L	85+80.000	152911.3765	617173.2954
9	L	86+20.000	152928.3138	617209.5326
10	L	86+60.000	152945.2511	617245.7697
11	L	87+00.000	152962.1884	617282.0068
12	L	87+40.000	152979.1784	617318.2191
13	L	87+80.000	152996.6920	617354.1802
14	L	88+20.000	153015.1789	617389.6503
15	L	88+60.000	153034.6716	617424.5777
16	L	89+00.000	153055.1542	617458.9340
17	L	89+40.000	153076.6098	617492.6912
18	L	89+80.000	153099.0211	617525.8216
19	L	90+20.000	153122.3696	617558.2983
20	L	90+60.000	153146.6364	617590.0948
21	L	91+00.000	153171.8017	617621.1850
22	L	91+40.000	153197.8448	617651.5436
23	L	91+80.000	153224.7446	617681.1458
24	L	92+20.000	153252.4791	617709.9675
25	L	92+60.000	153281.0256	617737.9851
26	L	93+00.000	153310.3609	617765.1758
27	L	93+40.000	153340.4610	617791.5174
28	L	93+80.000	153371.3013	617816.9883
29	L	94+20.000	153402.8566	617841.5678
30	L	94+60.000	153435.1013	617865.2358
31	L	95+00.000	153468.0089	617887.9729
32	L	95+40.000	153501.5526	617909.7608
33	L	95+80.000	153535.7051	617930.5814
34	L	96+20.000	153570.4384	617950.4179
35	L	96+60.000	153605.7242	617969.2541
36	L	97+00.000	153641.5338	617987.0746
37	L	97+40.000	153677.8378	618003.8647
38	L	97+80.000	153714.6066	618019.6110
39	L	98+20.000	153751.8103	618034.3004
40	L	98+60.000	153789.4184	618047.9209
41	L	99+00.000	153827.4003	618060.4616
42	L	99+40.000	153865.7249	618071.9121
43	L	99+80.000	153904.3610	618082.2631
44	L	100+20.000	153943.2771	618091.5061
45	L	100+60.000	153982.4413	618099.6336
46	L	101+00.000	154021.8217	618106.6389
47	L	101+40.000	154061.3861	618112.5164
48	L	101+80.000	154101.1023	618117.2613
49	L	102+20.000	154140.9379	618120.8696
50	L	102+60.000	154180.8603	618123.3384
51	L	103+00.000	154220.8332	618124.7925
52	L	103+40.000	154260.8194	618125.8434
53	L	103+80.000	154300.8060	618126.8768
54	L	104+20.000	154340.7927	618127.9101
55	L	104+60.000	154380.7793	618128.9435
56	L	105+00.000	154420.7660	618129.9769
57	L	105+40.000	154460.7526	618131.0102
58	L	105+80.000	154500.7393	618132.0436
59	L	106+20.000	154540.7259	618133.0769
60	L	106+60.000	154580.7126	618134.1103
61	L	107+00.000	154620.6992	618135.1436
62	L	107+40.000	154660.6859	618136.1770
63	L	107+80.000	154700.6725	618137.2103
64	L	108+20.000	154740.6592	618138.2437
65	Y_REV	11+40.000	154770.5020	617755.4250
66	Y_REV	11+60.000	154751.1245	617760.3758
67	Y_REV	11+80.000	154731.7630	617765.3888
68	Y_REV	12+00.000	154712.4747	617770.6755
69	Y_REV	12+20.000	154693.3290	617776.4558
70	Y_REV	12+40.000	154674.3668	617782.8121
71	Y_REV	12+60.000	154655.6058	617789.7400
72	Y_REV	12+80.000	154637.0634	617797.2332
73	Y_REV	13+00.000	154618.7565	617805.2847
74	Y_REV	13+20.000	154600.7019	617813.8872
75	Y_REV	13+40.000	154582.9163	617823.0328
76	Y_REV	13+60.000	154565.4160	617832.7131
77	Y_REV	13+80.000	154548.2170	617842.9191
78	Y_REV	14+00.000	154531.3351	617853.6416
79	Y_REV	14+20.000	154514.7858	617864.8706
80	Y_REV	14+40.000	154498.5822	617876.5930
81	Y_REV	14+60.000	154482.6710	617888.7100

Point #	Chain	Station	Northing (Y)	Easting (X)
82	Y_REV	14+80.000	154466.9156	617901.0293
83	Y_REV	15+00.000	154451.1894	617913.3860
84	Y_REV	15+20.000	154435.4632	617925.7426
85	Y_REV	15+40.000	154419.7370	617938.0992
86	Y_REV	15+60.000	154404.0108	617950.4559
87	Y_REV	15+80.000	154388.2846	617962.8125
88	Y_REV	16+00.000	154372.5584	617975.1691
89	Y_REV	16+20.000	154356.8321	617987.5257
90	Y_REV	16+40.000	154341.1059	617999.8824
91	Y_REV	16+60.000	154325.3797	618012.2390
92	Y_REV	16+80.000	154309.6535	618024.5956
93	Y_REV	17+00.000	154293.9273	618036.9523
94	Y_REV	17+20.000	154278.2011	618049.3089
95	Y_REV	17+40.000	154262.4749	618061.6655
96	Y_REV	17+60.000	154246.7487	618074.0222
97	Y_REV	17+80.000	154231.0225	618086.3788
98	Y_REV	18+00.000	154215.2963	618098.7354
99	Y_REV	18+20.000	154199.5700	618111.0920
100	Y_REV	18+40.000	154183.8438	618123.4487
101	Y_REV	18+60.000	154168.1176	618135.8053
102	Y_REV	18+80.000	154152.3914	618148.1619
103	Y_REV	19+00.000	154136.6652	618160.5186
104	Y_REV	19+20.000	154120.9390	618172.8752
105	Y_REV	19+40.000	154105.2128	618185.2318
106	Y_REV	19+60.000	154089.4866	618197.5885
107	Y_REV	19+80.000	154073.7601	618209.9448
108	Y_REV	20+00.000	154057.9921	618222.2479
109	Y_REV	20+20.000	154042.0581	618234.3349
110	Y_REV	20+40.000	154025.8385	618246.0353
111	Y_REV	20+60.000	154009.3007	618257.2814
112	Y_REV	20+80.000	153992.4569	618268.0638
113	Y_REV	21+00.000	153975.3201	618278.3743
114	Y_REV	21+20.000	153957.9036	618288.2048
115	Y_REV	21+40.000	153940.2207	618297.5477
116	Y_REV	21+60.000	153922.2852	618306.3960
117	Y_REV	21+80.000	153904.1108	618314.7427
118	Y_REV	22+00.000	153885.7117	618322.5814
119	Y_REV	22+20.000	153867.1178	618329.9470
120	Y_REV	22+40.000	153848.4082	618337.0142
121	Y_REV	22+48.815	153840.1465	618340.0876
122	Y_RPA	0+00.000	154701.0394	618123.0151
123	Y_RPA	0+20.000	154681.1388	618121.0235
124	Y_RPA	0+40.000	154661.2646	618118.7864
125	Y_RPA	0+60.000	154641.4522	618116.0595
126	Y_RPA	0+80.000	154621.7551	618112.6009
127	Y_RPA	1+00.000	154602.2525	618108.1794
128	Y_RPA	1+20.000	154583.0242	618102.6868
129	Y_RPA	1+40.000	154564.1305	618096.1350
130	Y_RPA	1+60.000	154545.6298	618088.5441
131	Y_RPA	1+80.000	154527.5791	618079.9377
132	Y_RPA	2+00.000	154510.0342	618070.3423
133	Y_RPA	2+20.000	154493.0491	618059.7875
134	Y_RPA	2+40.000	154476.6763	618048.3058
135	Y_RPA	2+60.000	154460.9663	618035.9327
136	Y_RPA	2+80.000	154446.0473	618022.6207
137	Y_RPA	3+00.000	154433.0501	618007.4595
138	Y_RPA	3+20.000	154424.1880	617989.6168
139	Y_RPA	3+40.000	154422.1195	617969.8557
140	Y_RPA	3+60.000	154427.8965	617950.8472
141	Y_RPA	3+80.000	154440.1758	617935.1594
142	Y_RPA	4+00.000	154455.4419	617922.2536
143	Y_RPA	4+00.488	154455.8259	617921.9518
144	Y_RPB	0+00.000	153641.9634	617971.5139
145	Y_RPB	0+20.000	153660.0299	617980.0925
146	Y_RPB	0+40.000	153678.2931	617988.2428
147	Y_RPB	0+60.000	153696.8127	617995.7913
148	Y_RPB	0+80.000	153715.6312	618002.5581
149	Y_RPB	1+00.000	153734.7684	618008.3606
150	Y_RPB	1+20.000	153754.1973	618013.0952
151	Y_RPB	1+40.000	153773.8591	618016.7436
152	Y_RPB	1+60.000	153793.6931	618019.2946
153	Y_RPB	1+80.000	153813.6382	618020.7404
154	Y_RPB	2+00.000	153833.6328	618021.0764
155	Y_RPB	2+20.000	153853.6152	618020.3017
156	Y_RPB	2+40.000	153873.5238	618018.4187
157	Y_RPB	2+60.000	153893.2971	618015.4330
158	Y_RPB	2+80.000	153912.8741	618011.3540
159	Y_RPB	3+00.000	153932.1944	618006.1943
160	Y_RPB	3+20.000	153951.1984	617999.9697
161	Y_RPB	3+40.000	153969.8274	617992.6995

Point #	Chain	Station	Northing (Y)	Easting (X)
162	Y_RPB	3+60.000	153988.0240	617984.4061
163	Y_RPB	3+80.000	154005.7321	617975.1151
164	Y_RPB	4+00.000	154022.9360	617964.9191
165	Y_RPB	4+20.000	154039.7648	617954.1133
166	Y_RPB	4+40.000	154056.4050	617943.0181
167	Y_RPB	4+60.000	154073.1542	617932.0901
168	Y_RPB	4+80.000	154090.5804	617922.2914
169	Y_RPB	5+00.000	154109.1010	617914.7992
170	Y_RPB	5+20.000	154128.6576	617910.7500
171	Y_RPB	5+40.000	154148.6254	617910.3709
172	Y_RPB	5+60.000	154168.3217	617913.6749
173	Y_RPB	5+80.000	154187.0306	617920.6468
174	Y_RPB	6+00.000	154204.2334	617930.8151
175	Y_RPB	6+20.000	154220.3165	617942.6977
176	Y_RPB	6+40.000	154235.9391	617955.1843
177	Y_RPB	6+60.000	154251.5043	617967.7432
178	Y_RPB	6+80.000	154267.0694	617980.3020
179	Y_RPB	7+00.000	154282.6346	617992.8609
180	Y_RPB	7+20.000	154298.1998	618005.4198
181	Y_RPB	7+40.000	154313.7650	618017.9786
182	Y_RPB	7+42.732	154315.8914	618019.6943
183	Y_LPB	0+00.000	154181.3322	618109.1448
184	Y_LPB	0+20.000	154161.3645	618108.0187
185	Y_LPB	0+40.000	154141.4875	618105.8510
186	Y_LPB	0+60.000	154121.9543	618101.6223
187	Y_LPB	0+80.000	154103.3342	618094.3990
188	Y_LPB	1+00.000	154086.6214	618083.4941
189	Y_LPB	1+20.000	154072.8969	618069.0098
190	Y_LPB	1+40.000	154062.9273	618051.7250
191	Y_LPB	1+60.000	154057.2620	618032.5922
192	Y_LPB	1+80.000	154056.2132	618012.6659
193	Y_LPB	2+00.000	154059.8387	617993.0441
194	Y_LPB	2+20.000	154067.9387	617974.8082
195	Y_LPB	2+40.000	154080.0668	617958.9632
196	Y_LPB	2+60.000	154095.5547	617946.3821
197	Y_LPB	2+80.000	154113.5489	617937.7584
198	Y_LPB	3+00.000	154133.0577	617933.5672
199	Y_LPB	3+20.000	154153.0060	617934.0396
200	Y_LPB	3+40.000	154172.2964	617939.1445
201	Y_LPB	3+60.000	154190.1275	617948.1463
202	Y_LPB	3+80.000	154206.5953	617959.4821
203	Y_LPB	4+00.000	154222.3938	617971.7455
204	Y_LPB	4+20.000	154238.1311	617984.0881
205	Y_LPB	4+40.000	154253.8684	617996.4306
206	Y_LPB	4+60.000	154269.3219	618009.1023
207	Y_LPB	4+80.000	154279.5961	618026.0699
208	Y_LPB	4+86.676	154281.2338	618032.5358
209	Y_RPC	0+00.000	153652.1539	618011.7551
210	Y_RPC	0+20.000	153669.7284	618021.3015
211	Y_RPC	0+40.000	153687.4065	618030.6546
212	Y_RPC	0+60.000	153705.1575	618039.8688
213	Y_RPC	0+80.000	153722.9516	618048.9995
214	Y_RPC	1+00.000	153740.7606	618058.1011
215	Y_RPC	1+20.000	153758.5702	618067.2015
216	Y_RPC	1+40.000	153776.3798	618076.3020
217	Y_RPC	1+60.000	153794.1894	618085.4024
218	Y_RPC	1+80.000	153811.9990	618094.5029
219	Y_RPC	2+00.000	153829.8086	618103.6033
220	Y_RPC	2+20.000	153847.6182	618112.7038
221	Y_RPC	2+40.000	153865.4278	618121.8042
222	Y_RPC	2+60.000	153883.2374	618130.9047
223	Y_RPC	2+80.000	153901.0383	618140.0220
224	Y_RPC	3+00.000	153918.4927	618149.7768
225	Y_RPC	3+20.000	153934.7019	618161.4583
226	Y_RPC	3+40.000	153948.3207	618176.0436
227	Y_RPC	3+60.000	153958.0598	618193.4554
228	Y_RPC	3+80.000	153963.3059	618212.7037
229	Y_RPC	4+00.000	153963.7485	618232.6493
230	Y_RPC	4+20.000	153959.3612	618252.1114
231	Y_RPC	4+40.000	153950.4039	618269.9379
232	Y_RPC	4+60.000	153937.4067	618285.0738
233	Y_RPC	4+80.000	153921.2653	618296.8243
234	Y_RPC	5+00.000	153903.5423	618306.0764
235	Y_RPC	5+06.732	153897.4511	618308.9426
236	Y_RPD	0+00.000	154627.0607	618149.5127
237	Y_RPD	0+20.000	154607.0665	618149.0331
238	Y_RPD	0+40.000	154587.0684	618148.7756
239	Y_RPD	0+60.000	154567.0699	618148.9626
240	Y_RPD	0+80.000	154547.0893	618149.8159

Point #	Chain	Station	Northing (Y)	Easting (X)
241	Y_RPD	1+00.000	154527.1668	618151.5514
242	Y_RPD	1+20.000	154507.3553	618154.2759
243	Y_RPD	1+40.000	154487.7048	618157.9872
244	Y_RPD	1+60.000	154468.2643	618162.6759
245	Y_RPD	1+80.000	154449.0825	618168.3303
246	Y_RPD	2+00.000	154430.2072	618174.9364
247	Y_RPD	2+20.000	154411.6857	618182.4777
248	Y_RPD	2+40.000	154393.5642	618190.9352
249	Y_RPD	2+60.000	154375.8881	618200.2878
250	Y_RPD	2+80.000	154358.7015	618210.5121
251	Y_RPD	3+00.000	154342.0474	618221.5827
252	Y_RPD	3+20.000	154325.9673	618233.4717
253	Y_RPD	3+40.000	154310.4537	618246.0921
254	Y_RPD	3+60.000	154295.3457	618259.1966
255	Y_RPD	3+80.000	154280.4344	618272.5253
256	Y_RPD	4+00.000	154265.3300	618285.6320
257	Y_RPD	4+20.000	154249.2086	618297.4482
258	Y_RPD	4+40.000	154231.4589	618306.5967
259	Y_RPD	4+60.000	154212.1793	618311.7580
260	Y_RPD	4+80.000	154192.2355	618312.5235
261	Y_RPD	5+00.000	154172.6170	618308.8551
262	Y_RPD	5+20.000	154154.2657	618300.9954
263	Y_RPD	5+40.000	154137.4686	618290.1633
264	Y_RPD	5+60.000	154121.5927	618278.0018
265	Y_RPD	5+80.000	154105.8553	618265.6593
266	Y_RPD	6+00.000	154090.1180	618253.3168
267	Y_RPD	6+20.000	154074.3807	618240.9743
268	Y_RPD	6+40.000	154058.6434	618228.6318
269	Y_RPD	6+45.631	154054.2123	618225.1566
270	Y_LPD	0+00.000	154159.5702	618136.3920
271	Y_LPD	0+20.000	154179.5186	618137.8175
272	Y_LPD	0+40.000	154199.3520	618140.3477
273	Y_LPD	0+60.000	154218.7726	618145.0591
274	Y_LPD	0+80.000	154237.1283	618152.9210
275	Y_LPD	1+00.000	154253.2985	618164.6055
276	Y_LPD	1+20.000	154266.0916	618179.9111
277	Y_LPD	1+40.000	154274.7003	618197.9058
278	Y_LPD	1+60.000	154278.5894	618217.4710
279	Y_LPD	1+80.000	154277.5171	618237.3901
280	Y_LPD	2+00.000	154271.5501	618256.4247
281	Y_LPD	2+20.000	154261.0594	618273.3913
282	Y_LPD	2+40.000	154246.6971	618287.2349
283	Y_LPD	2+60.000	154229.3564	618297.0950
284	Y_LPD	2+80.000	154210.1154	618302.3584
285	Y_LPD	3+00.000	154190.1703	618302.6978
286	Y_LPD	3+20.000	154170.7613	618298.0922
287	Y_LPD	3+40.000	154152.9661	618289.0427
288	Y_LPD	3+60.000	154136.7105	618277.4043
289	Y_LPD	3+80.000	154120.9650	618265.0724
290	Y_LPD	4+00.000	154105.2277	618252.7299
291	Y_LPD	4+20.000	154089.8477	618239.9887
292	Y_LPD	4+40.000	154083.1749	618221.5931
293	Y_LPD	4+45.025	154083.6944	618216.6024
294	Y1	10+00.000	154342.8278	617960.1900
295	Y1	10+20.000	154330.7977	617944.2126
296	Y1	10+40.000	154318.7676	617928.2352
297	Y1	10+60.000	154306.7375	617912.2579
298	Y1	10+80.000	154294.7074	617896.2805
299	Y1	11+00.000	154282.6773	617880.3031
300	Y1	11+20.000	154270.6472	617864.3257
301	Y1	11+40.000	154258.6171	617848.3484
302	Y1	11+60.000	154246.5870	617832.3710
303	Y1	11+80.000	154235.8482	617815.5352
304	Y1	12+00.000	154228.6428	617796.9139
305	Y1	12+20.000	154225.2805	617777.2324
306	Y1	12+40.000	154225.8954	617757.2752
307	Y1	12+60.000	154230.4629	617737.8379
308	Y1	12+80.000	154238.8009	617719.6955
309	Y1	13+00.000	154250.5770	617703.5713
310	Y1	13+20.000	154264.0811	617688.8187
311	Y1	13+40.000	154277.5894	617674.0699
312	Y1	13+60.000	154291.0977	617659.3212
313	Y1	13+80.000	154304.6060	617644.5725
314	Y1	14+00.000	154318.1143	617629.8237
315	Y1	14+20.000	154331.6226	617615.0750
316	Y1	14+40.000	154345.4994	617600.6840
317	Y1	14+60.000	154361.1868	617588.3076
318	Y1	14+80.000	154378.5292	617578.3823
319	Y1	15+00.000	154397.0871	617570.9529
320	Y1	15+20.000	154415.8771	617564.1021

Point #	Chain	Station	Northing (Y)	Easting (X)
321	Y1	15+40.000	154434.6672	617557.2512
322	Y1	15+42.446	154436.9651	617556.4134
323	Y4	10+00.000	154114.8573	618346.6483
324	Y4	10+20.000	154132.1284	618336.5821
325	Y4	10+40.000	154151.4698	618332.0427
326	Y4	10+60.000	154171.0521	618335.3934
327	Y4	10+80.000	154187.7838	618346.1054
328	Y4	11+00.000	154202.5440	618359.5643
329	Y4	11+20.000	154219.5386	618370.0513
330	Y4	11+40.000	154238.0424	618377.6188
331	Y4	11+50.589	154247.9289	618381.4117

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

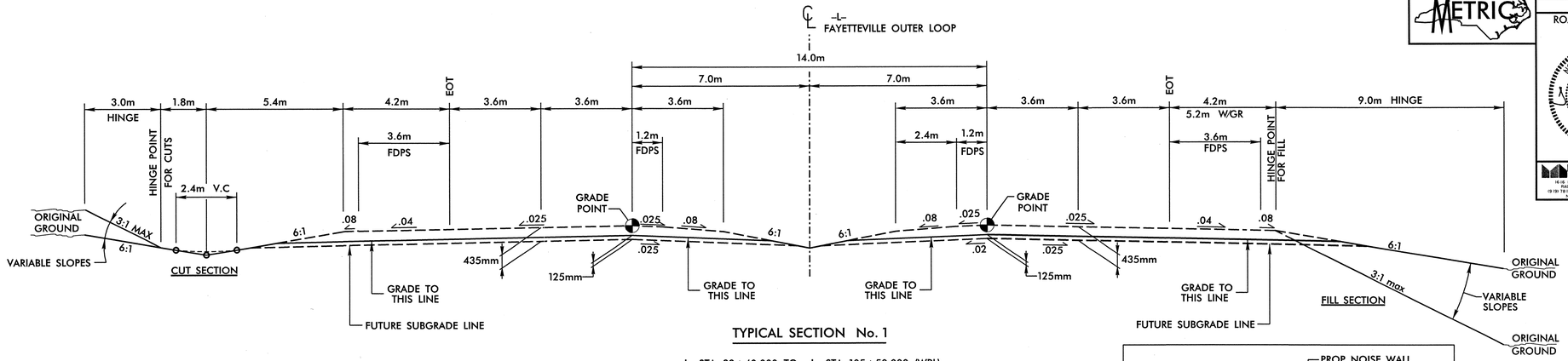
6-3-10

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 13868 ENGINEER DAN-CHI CHEN

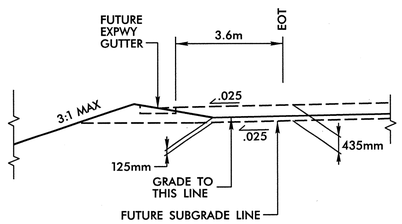
08/04/10

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC LICENSE NUMBER F-0105



TYPICAL SECTION No. 1

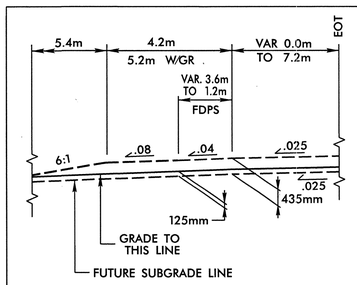
-L- STA 83+40.000 TO -L- STA 105+50.000 (WBL)
-L- STA 83+40.000 TO -L- STA 105+50.000 (EBL)



INSET DETAIL No. 1

TO BE USED IN CONJUNCTION WITH TYPICAL SECTION No. 1 AS FOLLOWS:

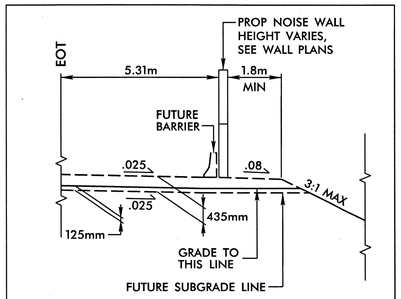
-L- STA 84+45.000 TO -L- STA 85+60.000 LT (WBL)
-L- STA 92+60.000 TO -L- STA 93+80.000 LT (WBL)



INSET DETAIL No. 2

TO BE USED IN CONJUNCTION WITH TYPICAL SECTION No. 1 AS FOLLOWS:

-L- STA 90+45.000 TO -L- STA 96+93.589 LT
-L- STA 83+40.000 TO -L- STA 102+39.560 RT



INSET DETAIL No. 3

TO BE USED IN CONJUNCTION WITH TYPICAL SECTION No. 1 AS FOLLOWS:

-L- STA 83+40.000 TO -L- STA 92+10.000 RT

PAVEMENT SCHEDULE

CODE	DESCRIPTION	CODE	DESCRIPTION
C1	PROP. APPROX. 80mm ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 96 kg PER SQ. METER IN EACH OF TWO LAYERS.	J1	PROP. 150mm AGGREGATE BASE COURSE
C2	PROP. VAR. DEPTH ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 2.4 kg PER SQ. METER PER 1mm DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 40mm OR GREATER THAN 50mm IN DEPTH.	J2	PROP. 200mm AGGREGATE BASE COURSE
C3	PROP. APPROX. 60mm ASPHALT CONC. SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 70.5 kg PER SQ. METER IN EACH OF TWO LAYERS.	J3	PROP. VAR. DEPTH AGGREGATE BASE COURSE
C4	PROP. VAR. DEPTH ASPHALT CONC. SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 2.35 kg PER SQ. METER PER 1mm DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 25mm OR GREATER THAN 40mm IN DEPTH.	P	PRIME COAT AT THE RATE OF 1.6 L PER SQ. METER.
D1	PROP. APPROX. 65mm ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 159.25 kg PER SQ. METER.	R1	750mm CONC. CURB & GUTTER
D2	PROP. APPROX. 100mm ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 245 kg PER SQ. METER.	R2	450mm CONC. CURB & GUTTER
D3	PROP. VAR. DEPTH ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 2.45 kg PER SQ. METER PER 1mm DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 65mm OR GREATER THAN 110mm IN DEPTH.	R3	125mm MONOLITHIC CONC. ISLAND
E1	PROP. APPROX. 100mm ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 245 kg PER SQ. METER.	T	EARTH MATERIAL
E2	PROP. VAR. DEPTH ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 2.45 kg PER SQ. METER PER 1mm DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 75mm OR GREATER THAN 140mm IN DEPTH.	U	EXISTING PAVEMENT
		W	VARIABLE DEPTH BITUMINOUS PAVEMENT (SEE STANDARD WEDGING DETAIL SHEET NO. 2-E)

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.

6/8/2010
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PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-A

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 13268 ENGINEER BING-CHI CHEN

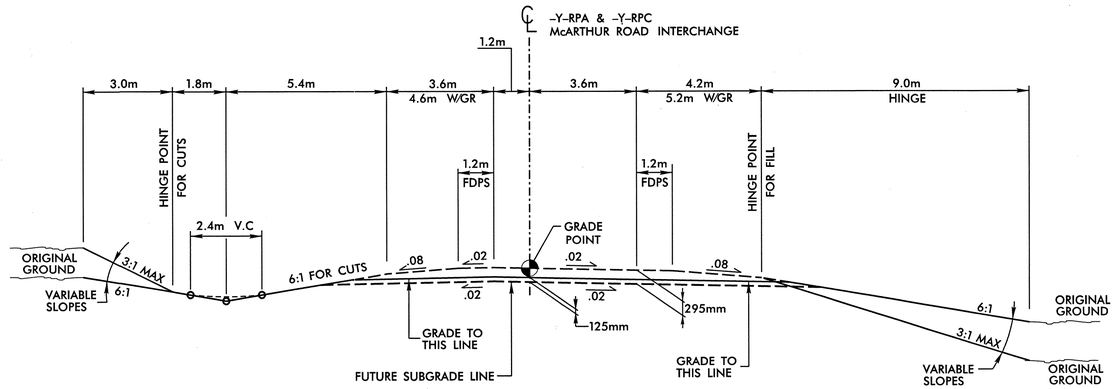
06/04/10

MOFFATT & NICHOL
4700 EAST MILLBROOK ROAD, SUITE 100
RALEIGH, NORTH CAROLINA 27609
(919) 781-9626 VOICE (919) 781-6869 FAX
NC LICENSE NUMBER F-0105

PAVEMENT SCHEDULE

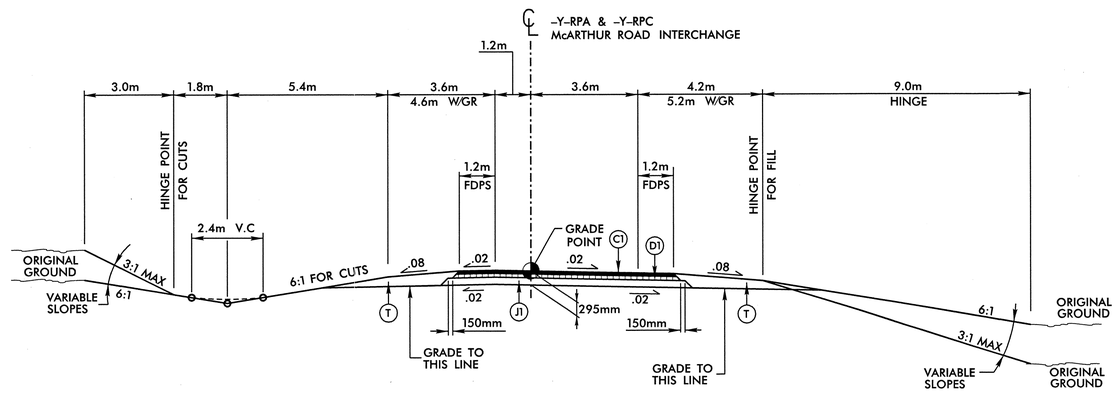
CODE	DESCRIPTION
C1	80mm S9.5B
D1	65 mm I19.0B
J1	150 mm ABC
T	EARTH MATERIAL

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.



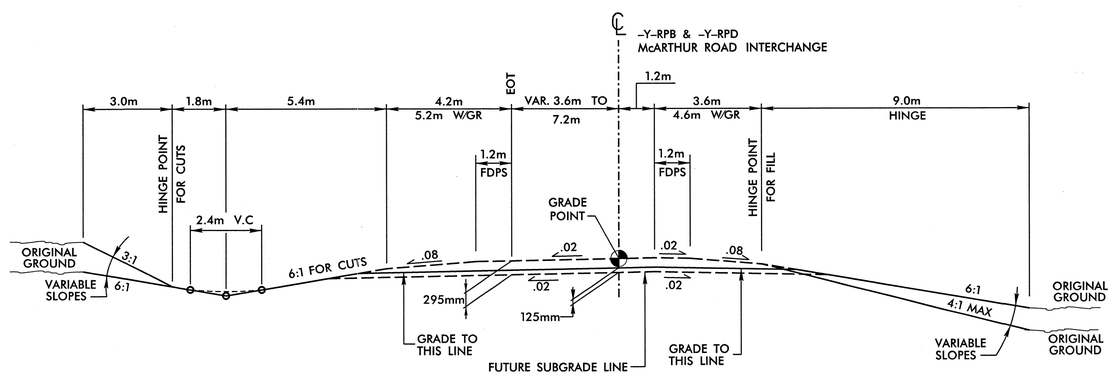
TYPICAL SECTION No. 2

-Y-RPA STA 2+70.000 TO -Y-RPC STA 3+30.000
-Y-RPC STA 0+00.000 TO -Y-RPC STA 4+10.000



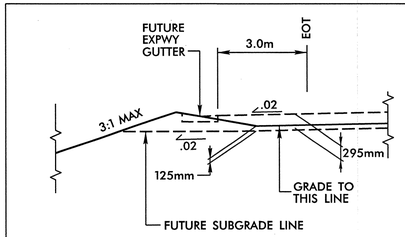
TYPICAL SECTION No. 3

-Y-RPA STA 3+30.000 TO -Y-RPA STA 4+00.488
-Y-RPC STA 4+10.000 TO -Y-RPC STA 5+06.732



TYPICAL SECTION No. 4

-Y-RPB STA 0+00.000 TO -Y-RPB TA 6+80.000
-Y-RPD STA 1+50.000 TO -Y-RPD STA 5+90.000



INSET DETAIL No. 4

TO BE USED IN CONJUNCTION WITH TYPICAL SECTION No. 4 AS FOLLOWS:

-Y-RPD STA 2+45.000 TO STA -Y-RPD 3+30.000 LT

6/16/98

6/3/2010
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cpowell

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-B

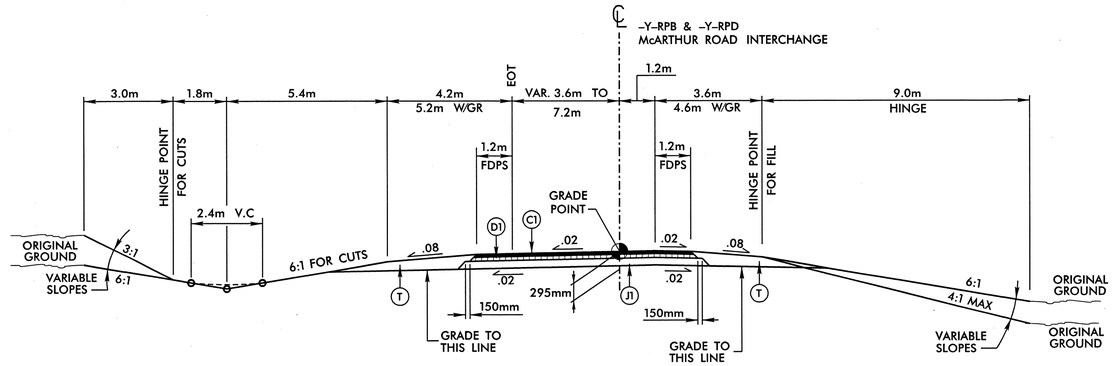
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID 6-3-10

PAVEMENT DESIGN ENGINEER

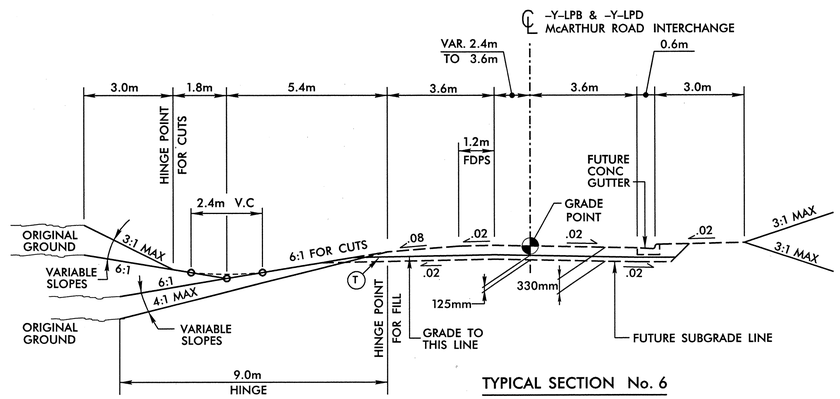
NORTH CAROLINA PROFESSIONAL SEAL 13368 ENGINEER DON-CHI CHEN 06/04/10

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4669 FAX
NC LICENSE NUMBER F-0105



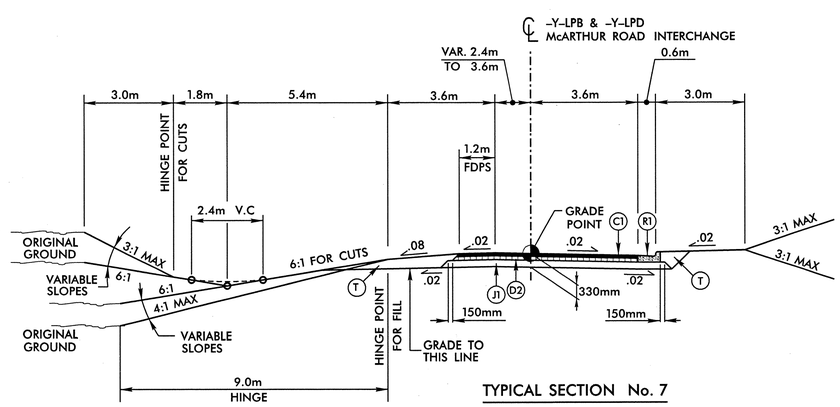
TYPICAL SECTION No. 5

-Y-RPB STA 6+80.000 TO -Y-RPB TA 7+27.341
-Y-RPD STA 5+90.000 TO -Y-RPD STA 6+30.149



TYPICAL SECTION No. 6

-Y-LPB STA 0+00.000 TO -Y-LPB STA 4+40.019
-Y-LPD STA 0+00.000 TO -Y-LPD STA 4+01.527



TYPICAL SECTION No. 7

-Y-LPB STA 4+40.019 TO -Y-LPB STA 4+86.676
-Y-LPD STA 4+01.527 TO -Y-LPD STA 4+36.223

PAVEMENT SCHEDULE

CODE	DESCRIPTION
C1	80mm S9.5B
D1	65 mm I19.0B
D2	100 mm I19.0B
J1	150 mm ABC
R1	750mm CURB & GUTTER
T	EARTH MATERIAL

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.

6/16/99

6/3/2010
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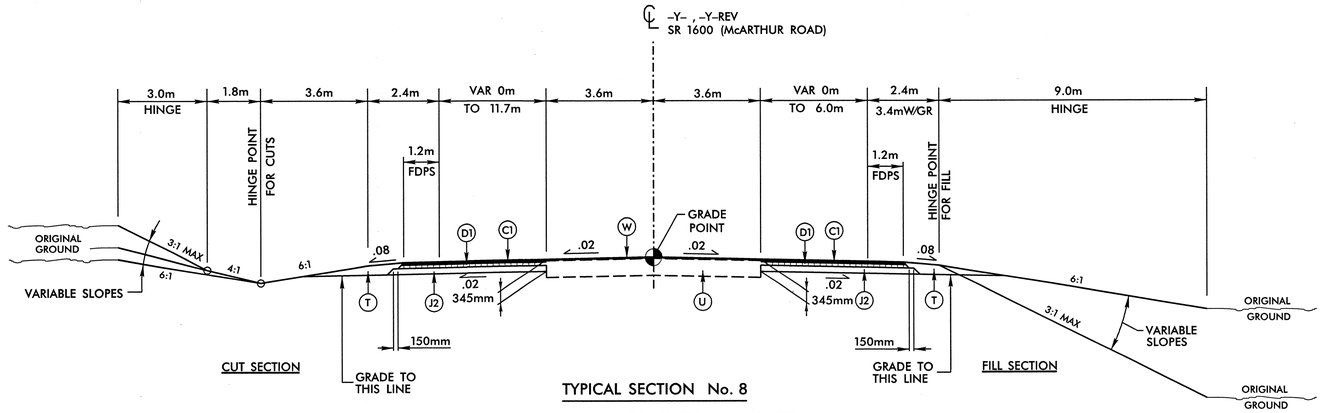
cpowell

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-C
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID 6-3-10

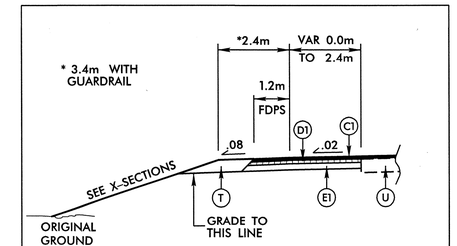
NORTH CAROLINA PROFESSIONAL SEAL 13368 ENGINEER DAI-CHI CHEN 06/04/10

MOFFATT & NICHOL
1616 EAST MILBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-6869 FAX
NC LICENSE NUMBER F-0105



TYPICAL SECTION No. 8

-Y- STA 9+75.000 TO -Y- STA 11+20.000 (LB)
-Y-REV STA 11+20.000 (LA) TO -Y-REV STA 11+74.000
-Y-REV STA 21+82.000 TO -Y-REV STA 22+48.815 (LB)
-Y- STA 22+57.111 (LA) TO -Y- STA 25+60.000



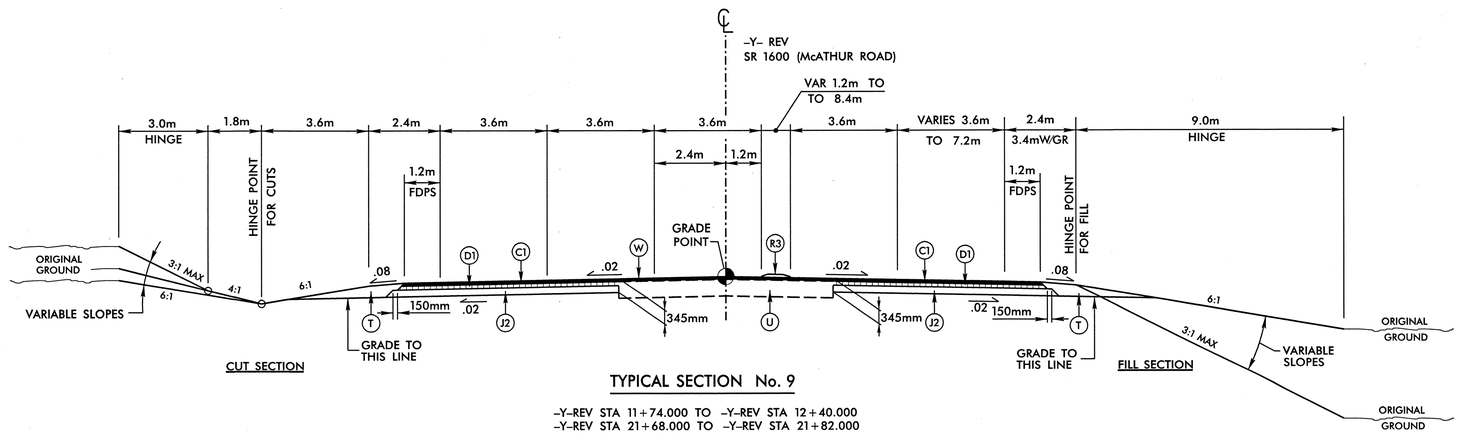
DETAIL SHOWING NARROW WIDENING

TO BE USED IN CONJUNCTION WITH TYPICAL SECTION No. 8

PAVEMENT SCHEDULE

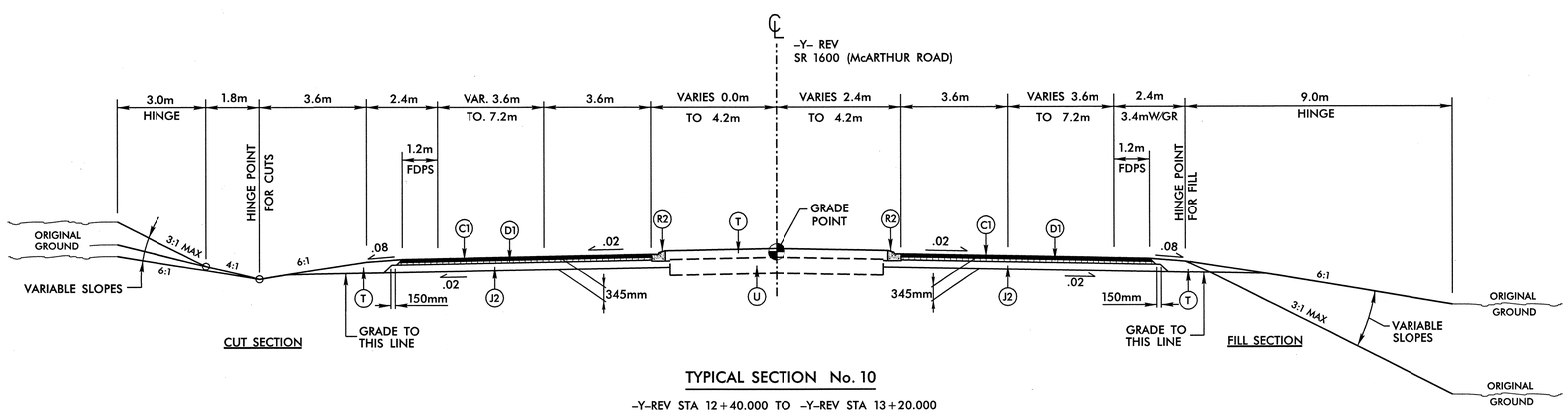
CODE	DESCRIPTION
C1	80mm S9.5B
D1	65 mm I19.0B
E1	100 mm B25.0B
J2	200 mm ABC
R2	450mm CURB & GUTTER
R3	125mm MONO. CONC. ISLAND
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE WEDGING

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.



TYPICAL SECTION No. 9

-Y-REV STA 11+74.000 TO -Y-REV STA 12+40.000
-Y-REV STA 21+68.000 TO -Y-REV STA 21+82.000



TYPICAL SECTION No. 10

-Y-REV STA 12+40.000 TO -Y-REV STA 13+20.000
-Y-REV STA 21+33.000 TO -Y-REV STA 21+68.000

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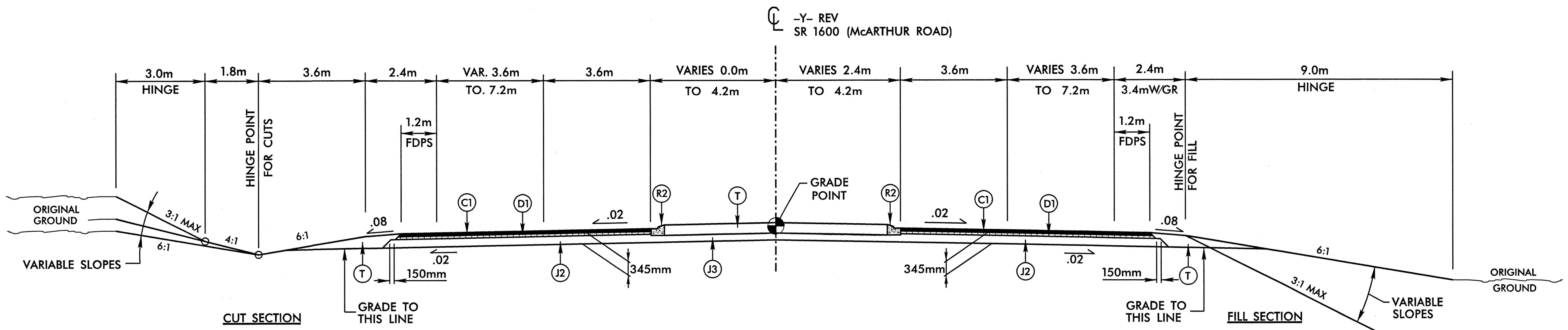
PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-D

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 15869 T. R. REID 6-3-10

PAVEMENT DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 13368 DON-CHI CHEN 06/04/10

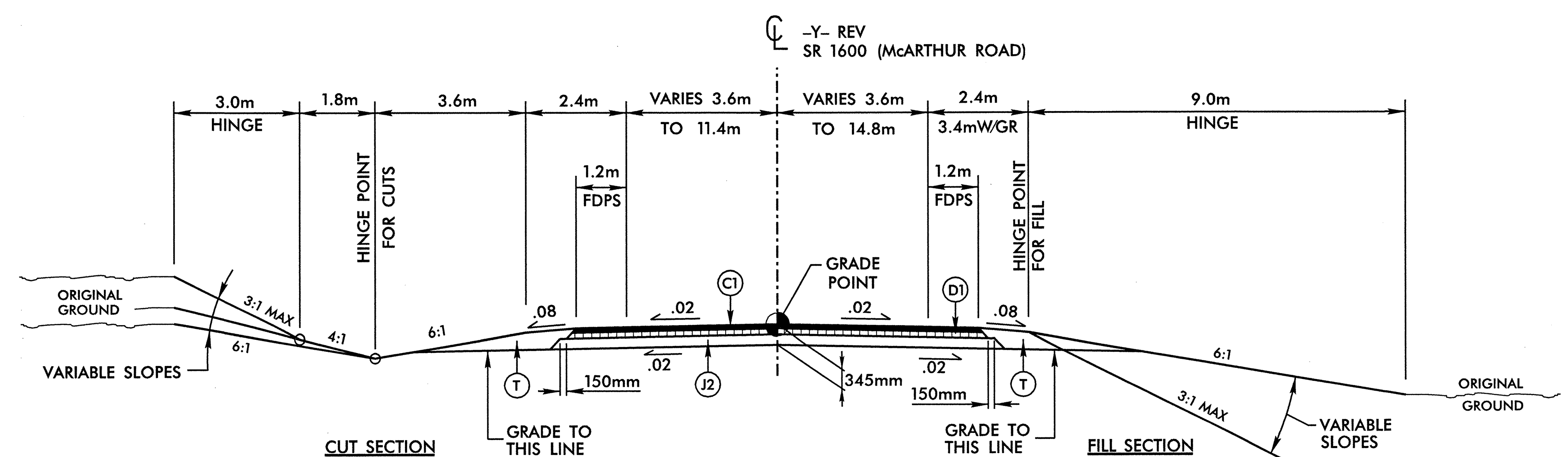
MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC LICENSE NUMBER F-0105

METRIC



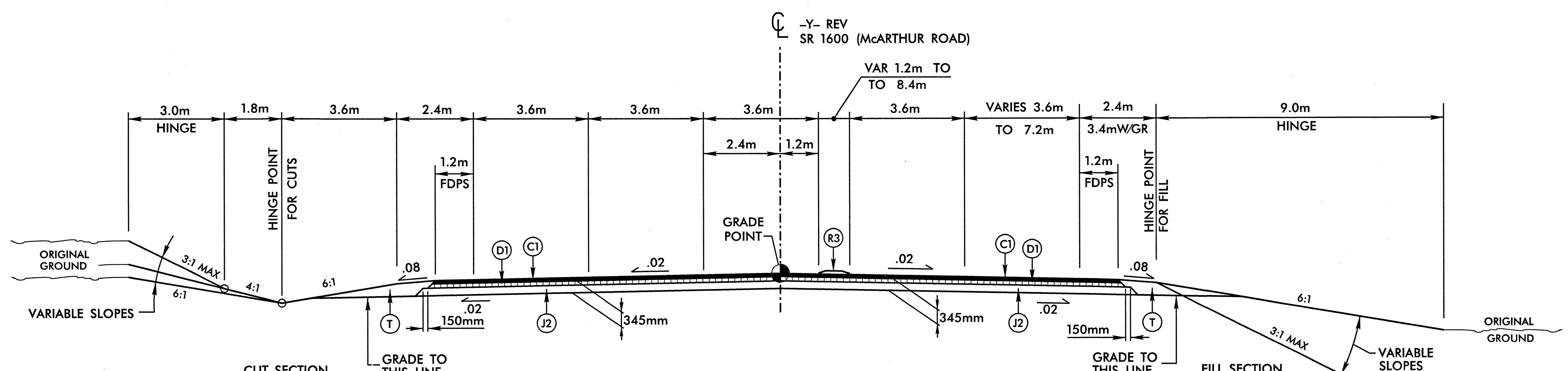
TYPICAL SECTION No. 11

-Y-REV STA 13+20.000 TO -Y-REV STA 16+67.000
-Y-REV STA 20+10.000 TO -Y-REV STA 21+33.000



TYPICAL SECTION No. 12

-Y-REV STA 16+74.000 TO -Y-REV STA 17+05.000
-Y-REV STA 19+69.000 TO -Y-REV STA 20+02.000
-Y-REV STA 21+82.000 TO -Y-REV STA 22+48.815 (LB)



TYPICAL SECTION No. 13

-Y-REV STA 16+67.000 TO -Y-REV STA 16+74.000
-Y-REV STA 17+05.000 TO -Y-REV STA 17+86.093 (BEGIN BRIDGE)
-Y-REV STA 18+92.093 (END BRIDGE) TO -Y-REV STA 19+69.000
-Y-REV STA 20+02.000 TO -Y-REV STA 20+10.000

PAVEMENT SCHEDULE

CODE	DESCRIPTION
C1	80mm S9.5B
D1	65 mm I19.0B
J2	200 mm ABC
J3	VARIABLE DEPTH ABC
R2	450mm CONC. CURB AND GUTTER
R3	125mm MONO. CONC. ISLAND
T	EARTH MATERIAL

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.

6/16/99

6/3/2010
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cpowell

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-E

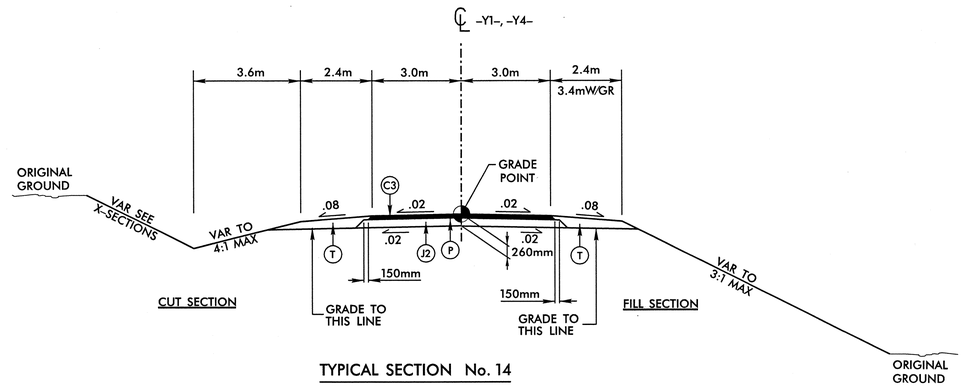
ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID 10-2-10

PAVEMENT DESIGN ENGINEER

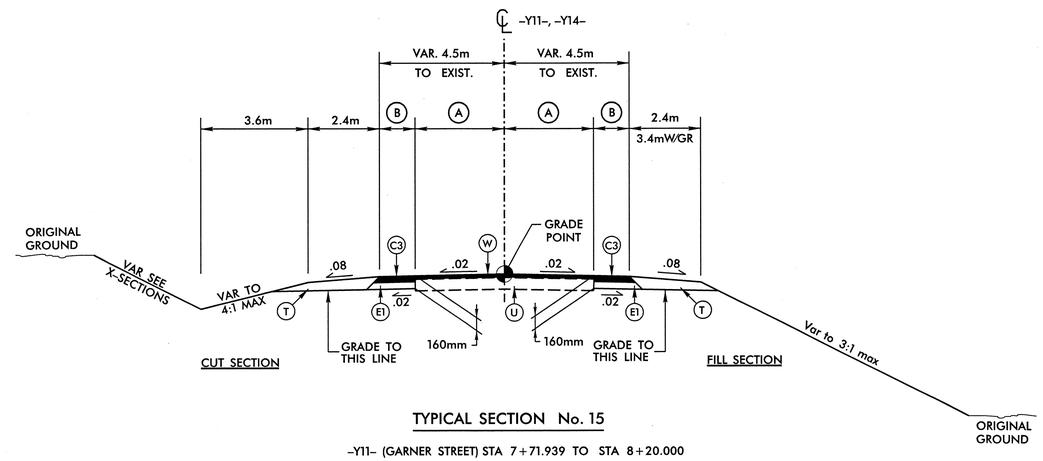
NORTH CAROLINA PROFESSIONAL SEAL 13368 ENGINEER CHI CHEN 06/04/10

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC LICENSE NUMBER F-0105



TYPICAL SECTION No. 14

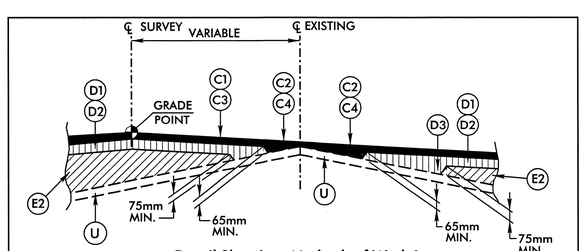
-Y1- (SERVICE ROAD) {Connects Colonial w/Charles} STA 11+62.382 TO STA 15+20.000
-Y4- (SERVICE ROAD) {Connects Sandstone w/Clover Hill} STA 10+14.341 TO STA 10+82.341



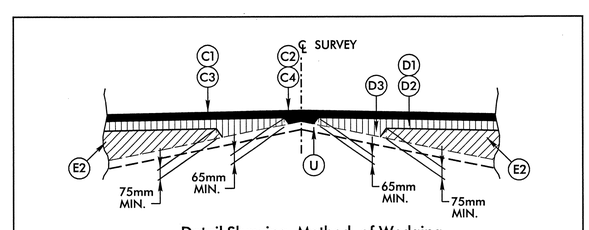
TYPICAL SECTION No. 15

-Y11- (GARNER STREET) STA 7+71.939 TO STA 8+20.000
-Y14- (ELOISE STREET) STA 10+09.742 TO STA 10+60.000

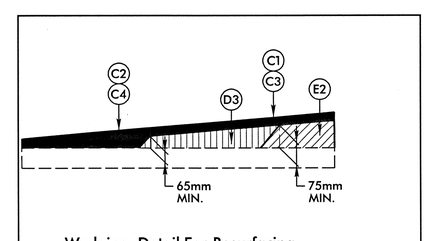
BASELINE	A		B
-Y11- (GARNER STREET)	3.1m	3.1m	VAR. 0.0m TO 1.4m
-Y14- (ELOISE STREET)	3.3m	3.3m	VAR. 0.0m TO 1.2m



Detail Showing Method of Wedging



Detail Showing Method of Wedging



Wedging Detail For Resurfacing

METRIC

PAVEMENT SCHEDULE

CODE	DESCRIPTION
C1	80mm S9.5B
C2	VARIABLE DEPTH S9.5B
C3	60 mm SF9.5A
C4	VARIABLE DEPTH SF9.5A
D1	65 mm I19.0B
D2	100 mm I19.0B
D3	VARIABLE DEPTH I19.0B
E1	100 mm B25.0B
E2	VARIABLE DEPTH B25.0B
J2	200 mm ABC
P	PRIME COAT
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE WEDGING

NOTE: ALL PAVEMENT EDGE SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.

6/16/2010

6/23/2010
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cpowell

TYPICAL SECTION ON STRUCTURES

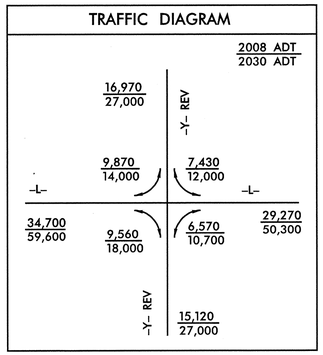
PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-F
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

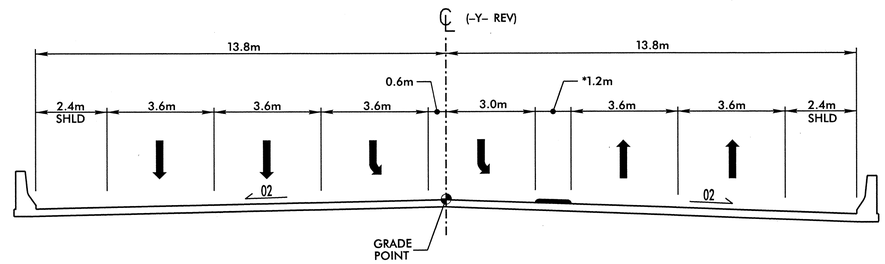
NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID
6-3-10

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4669 FAX
NC LICENSE NUMBER F-0105

METRIC

TRAFFIC DIAGRAM

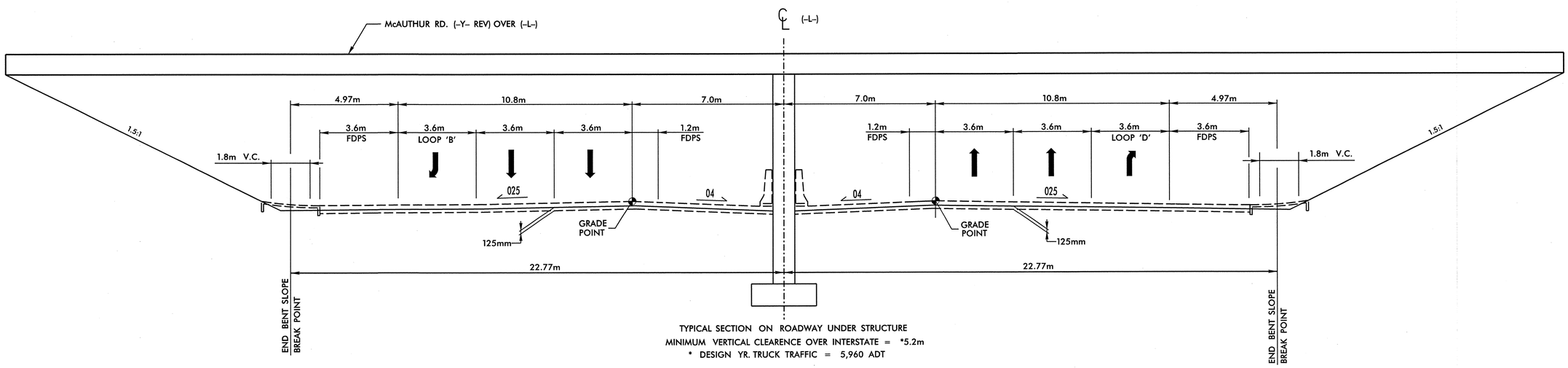




TYPICAL SECTION ON STRUCTURE

FUNCTIONAL CLASSIFICATION = COLLECTOR

*RAISED ISLAND VARIES ACROSS STRUCTURE TO DEVELOP SECOND LEFT TURN LANE IN EACH DIRECTION.



TYPICAL SECTION ON ROADWAY UNDER STRUCTURE
MINIMUM VERTICAL CLEARENCE OVER INTERSTATE = *5.2m
* DESIGN YR. TRUCK TRAFFIC = 5,960 ADT

BRIDGE TYPICAL No. 1
(SEE ROADWAY TYPICAL No. 10)

STRUCTURE ON -Y-REV (STA 17+86.093)

FUNCTIONAL CLASSIFICATION = INTERSTATE

6/3/2010
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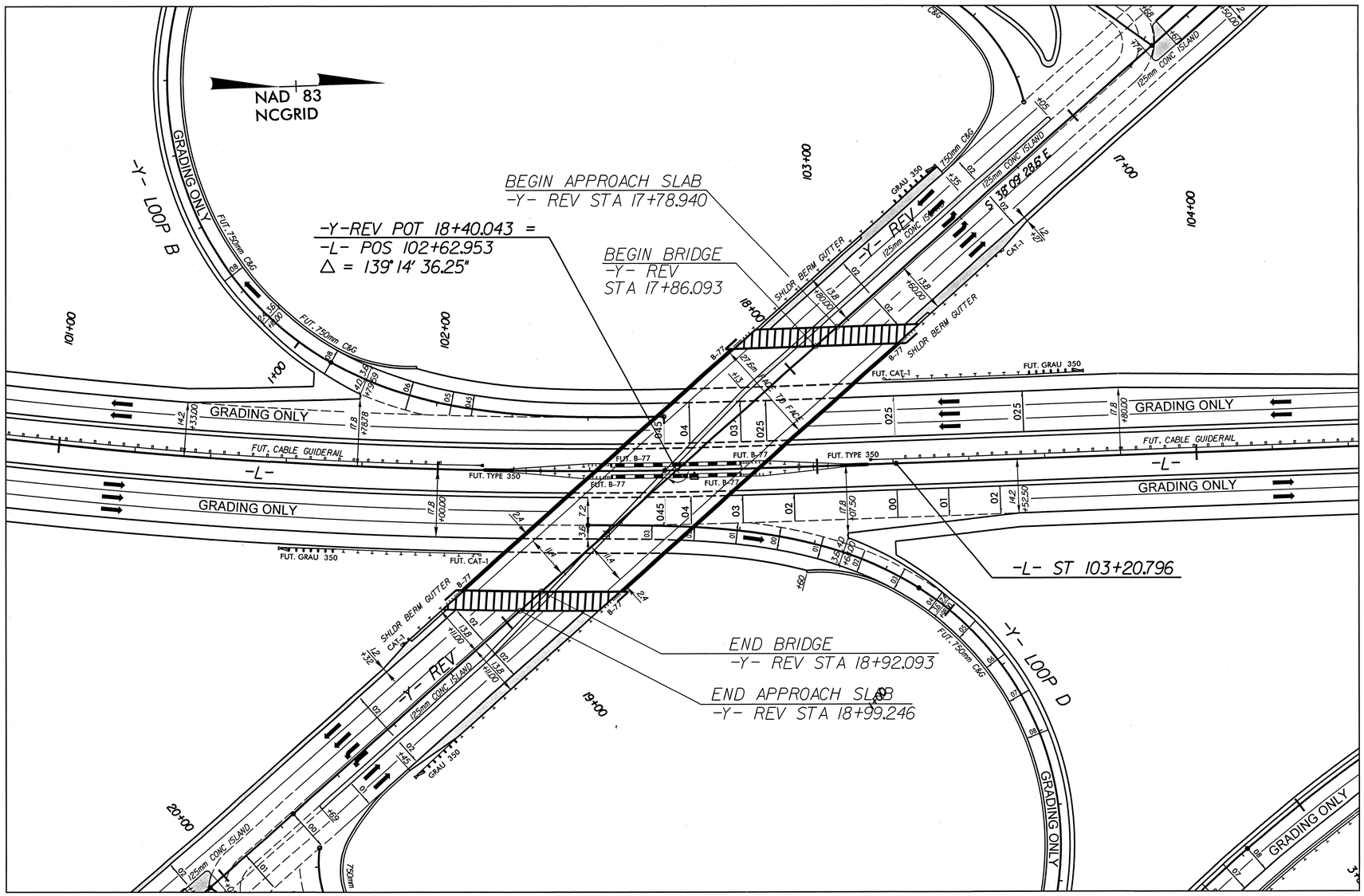
PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-G
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

MOFFATT & NICHOL
16-16 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-6869 FAX
NC LICENSE NUMBER F-0105

SKETCH SHOWING BRIDGE IN RELATIONSHIP TO PAVEMENT



BRIDGE SKETCH No. 1

DETAIL SHOWING PAVEMENT-BRIDGE RELATIONSHIP FOR -Y-REV (SR 1600 McARTHUR ROAD) OVER -L- (FAYETTEVILLE OUTER LOOP)

BRIDGE APPROACH SLAB

6/16/99

6/3/2010
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PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-H
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

METRIC

2.5 0 5

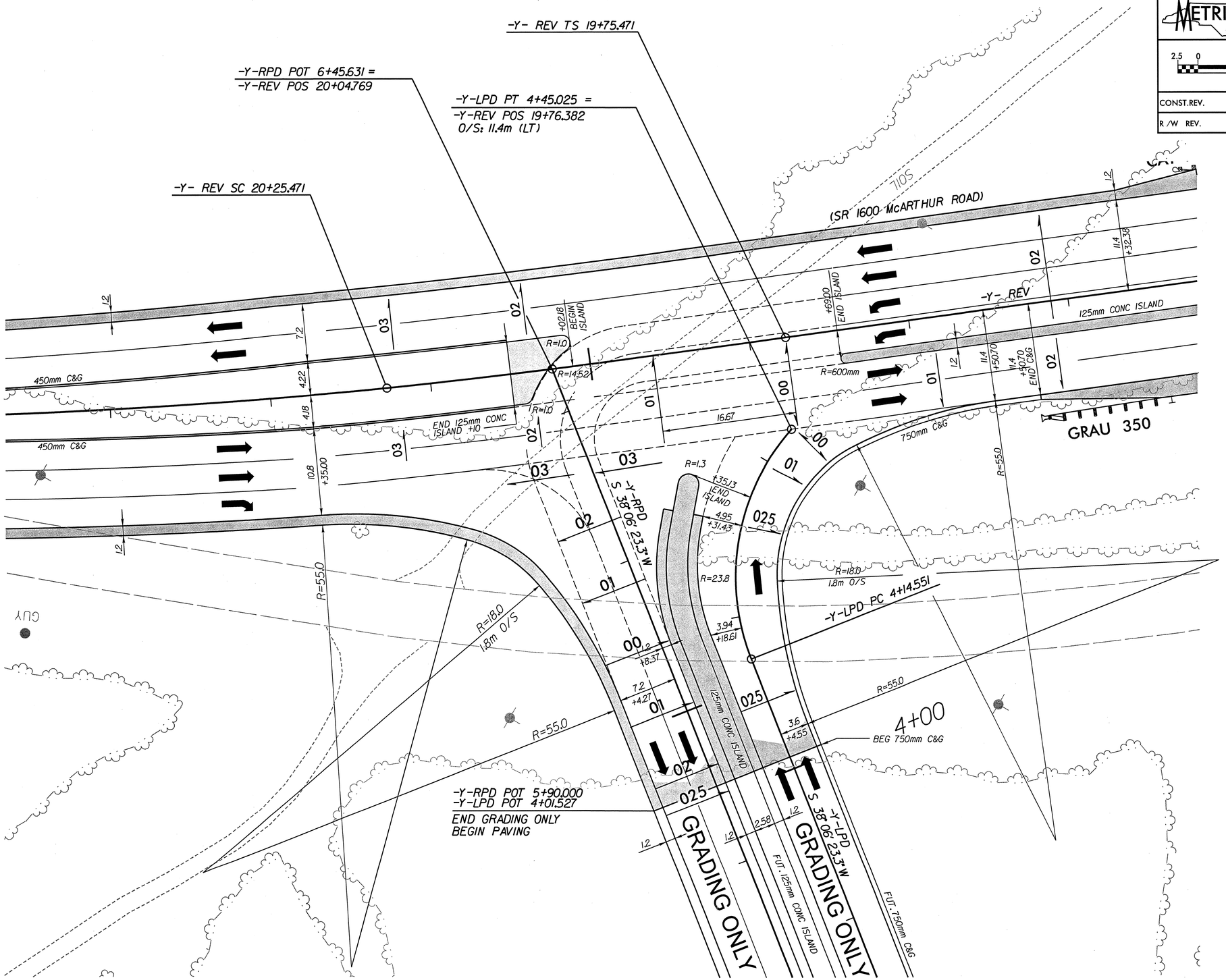
CONST.REV.

R/W REV.

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

MOFFATT & NICHOL
16 16 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4669 FAX
NC LICENSE NUMBER F-0105



INTERSECTION DETAIL OF -Y-REV AND -Y-RPD /-Y-LPD

6/16/99

6/3/2010
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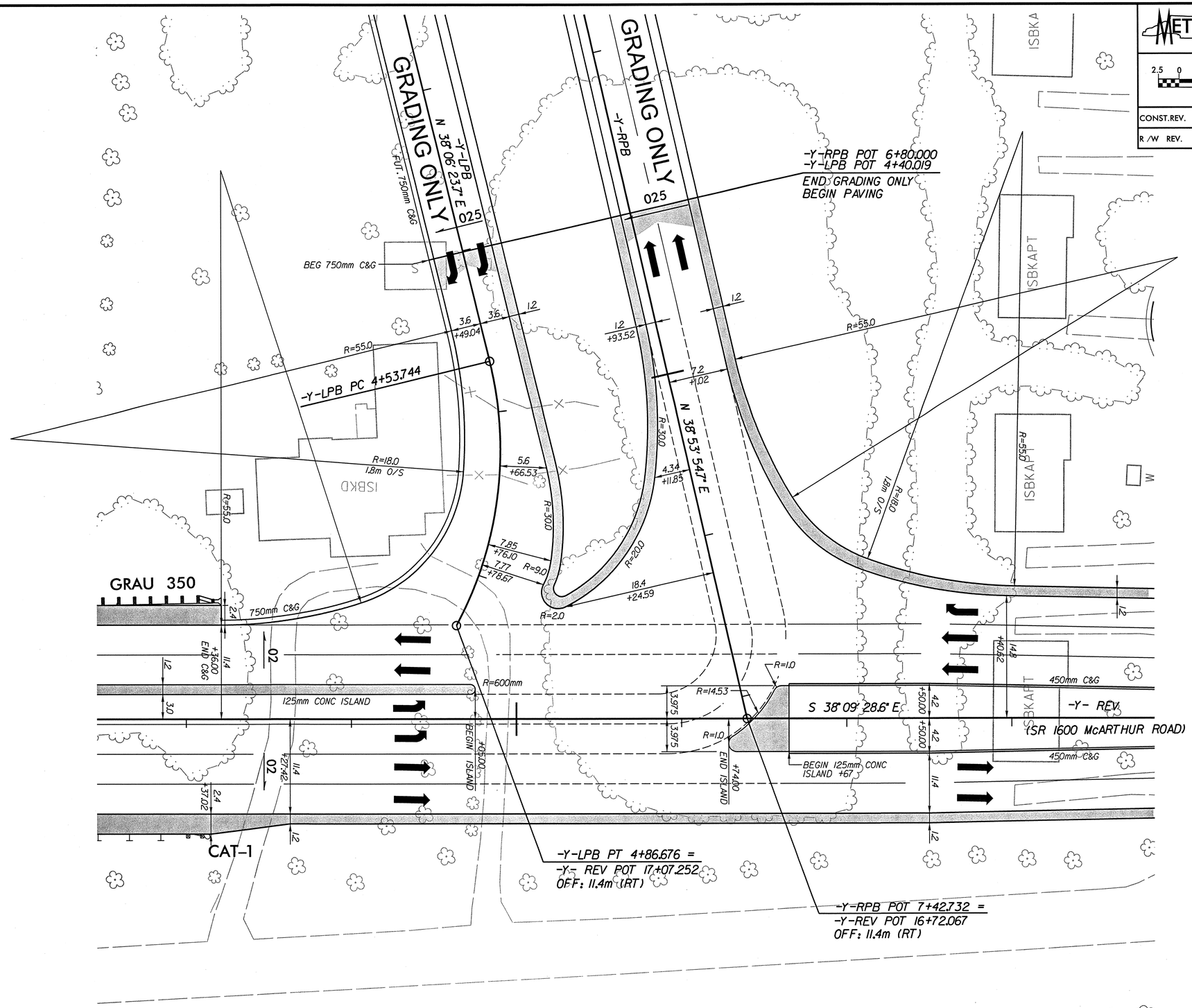
cpowell



INTERSECTION DETAIL OF -Y-REV AND -Y-RPB /-Y-LPB

METRIC

2.5 0 5

CONST.REV.

R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-1
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

MOFFATT & NICHOL
16-18 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-6869 FAX
NC LICENSE NUMBER F-0105

6/16/99

6/3/2010
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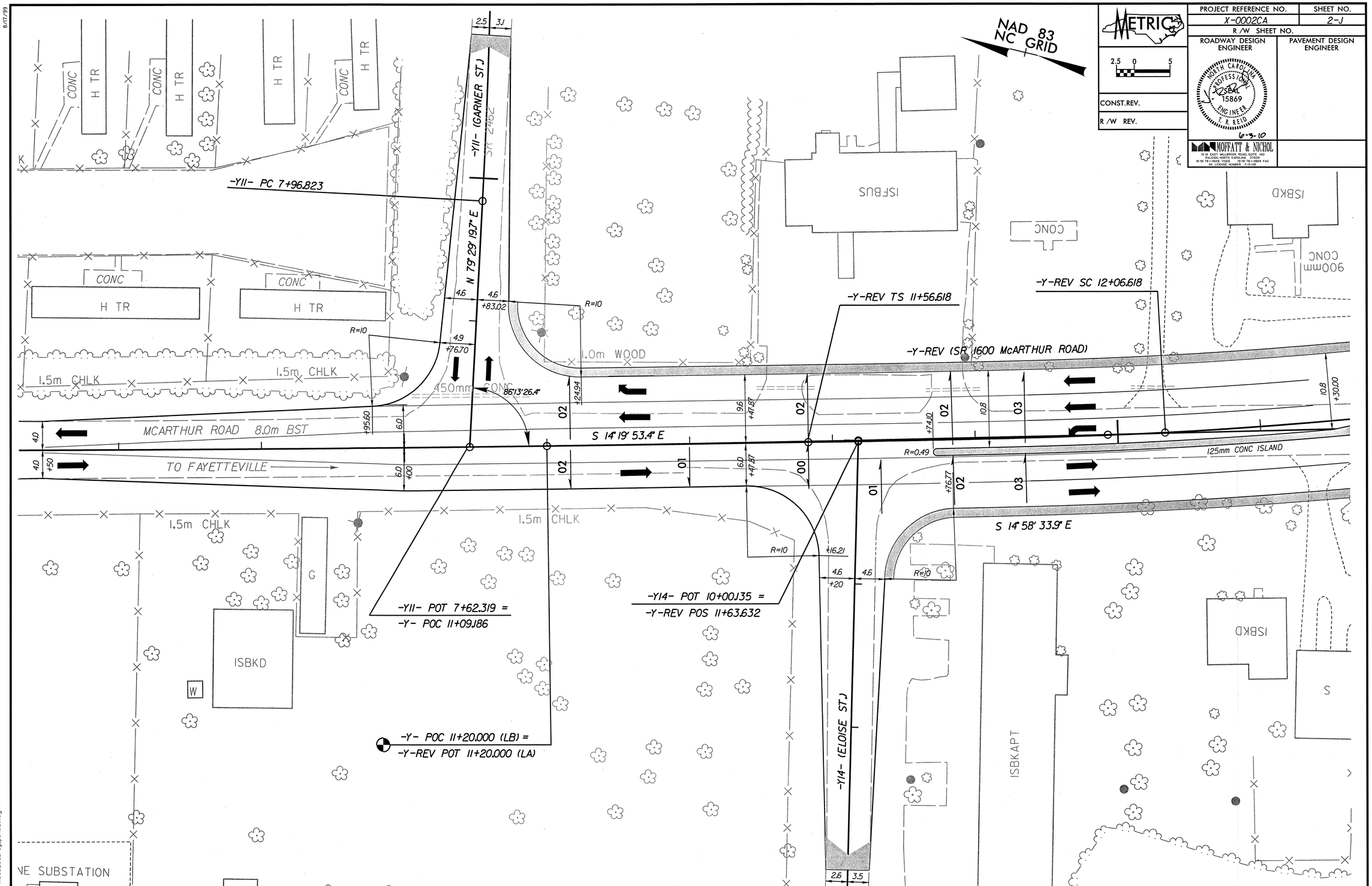

INTERSECTION DETAIL OF -Y-REV AND -Y11- /-Y- REV AND -Y14-

8/17/99

6/3/2010
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opowell

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-K
R/W SHEET NO.	

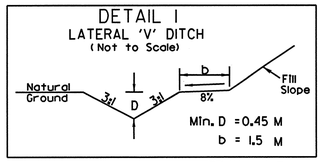
ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER F. R. REID — 6-3-10

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS III — 6/3/10

MOFFATT & NICHOL — 1616 EAST MILLBROOK ROAD, SUITE 160, RALEIGH, NORTH CAROLINA 27609

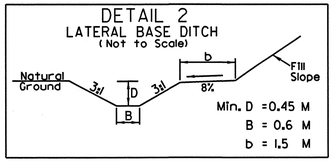
SDG Sungate Design Group, P.A. — 5104-A Jones Franklin Rd., Raleigh, N.C. 27606

DETAIL 1
LATERAL 'V' DITCH
(Not to Scale)



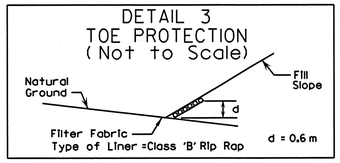
STA 83+80 TO STA 84+56 -L- LT
STA 14+11 TO STA 14+46 -Y1- LT
STA 14+52 TO STA 14+60 -Y1- LT

DETAIL 2
LATERAL BASE DITCH
(Not to Scale)



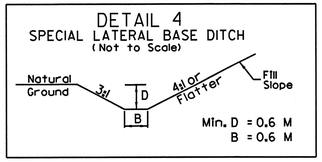
STA 84+40 TO STA 85+00 -L- RT

DETAIL 3
TOE PROTECTION
(Not to Scale)



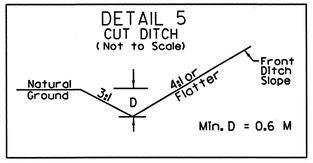
STA 84+15 TO STA 84+42 -L- RT
STA 93+00 TO STA 93+40 -L- RT

DETAIL 4
SPECIAL LATERAL BASE DITCH
(Not to Scale)



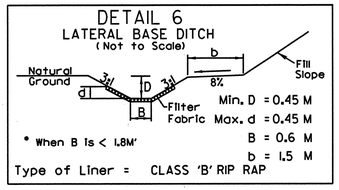
STA 94+72 TO STA 95+60 -L- RT
STA 2+43 TO STA 3+15 -Y-LPD RT
STA 15+40 TO STA 16+20 -Y-REV RT

DETAIL 5
CUT DITCH
(Not to Scale)



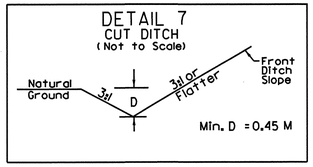
STA 102+00 TO STA 102+60 -L- RT
STA 101+60 TO STA 101+80 -L- RT
STA 5+20 TO STA 6+00 -Y-RPB LT

DETAIL 6
LATERAL BASE DITCH
(Not to Scale)



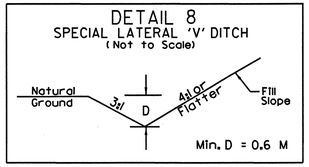
STA 83+40 TO STA 83+76 -L- RT

DETAIL 7
CUT DITCH
(Not to Scale)



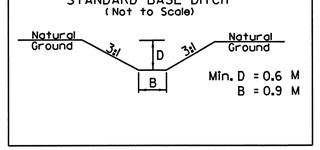
STA 12+20 TO STA 12+80 -Y1- RT
STA 15+00 TO STA 15+20 -Y1- LT

DETAIL 8
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



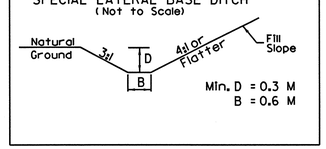
STA 3+62 TO STA 4+48 -Y-LPB RT
STA 17+31 TO STA 17+65 -Y-REV RT
STA 12+80 TO STA 13+43 -Y1- RT
STA 14+60 TO STA 15+00 -Y1- LT
STA 14+12 TO STA 14+60 -Y-REV RT

DETAIL 9
STANDARD BASE DITCH
(Not to Scale)



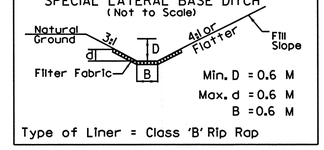
STA 15+30 TO STA 15+34 -Y-REV LT

DETAIL 10
SPECIAL LATERAL BASE DITCH
(Not to Scale)



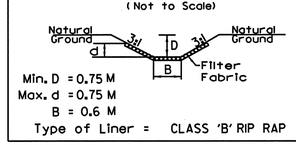
STA 3+80 TO STA 4+10 -Y-RPC LT
STA 20+40 TO STA 20+75 -Y-REV RT

DETAIL 11
SPECIAL LATERAL BASE DITCH
(Not to Scale)



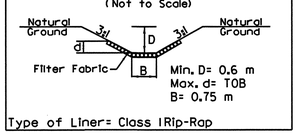
STA 105+10 TO STA 105+60 -L- LT
STA 13+80 TO STA 14+11 -Y-REV LT

DETAIL 12
BASE DITCH
(Not to Scale)



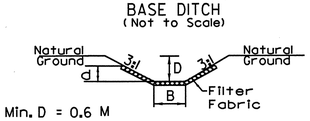
STA 104+92 TO STA 105+02 -L- RT

DETAIL 13
BASE DITCH
(Not to Scale)



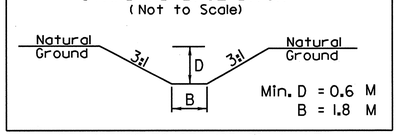
STA 92+93 TO STA 93+00 -L- RT

DETAIL 14
BASE DITCH
(Not to Scale)



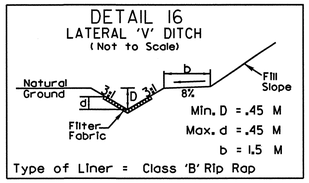
STA 2+32 TO STA 2+55 -Y-RPD LT

DETAIL 15
STANDARD BASE DITCH
(Not to Scale)



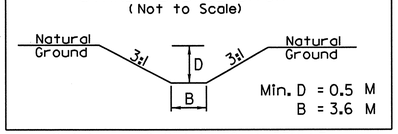
STA 104+89 TO STA 105+02 -L- LT

DETAIL 16
LATERAL 'V' DITCH
(Not to Scale)



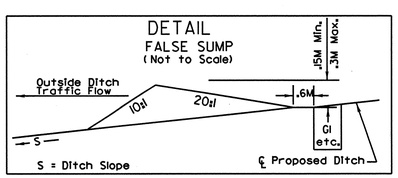
STA 13+40 TO STA 13+73 -Y1- RT

DETAIL 17
STANDARD BASE DITCH
(Not to Scale)

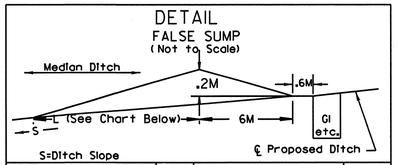


STA 14+55 TO STA 14+70 -Y-REV LT

DETAIL
FALSE SUMP
(Not to Scale)

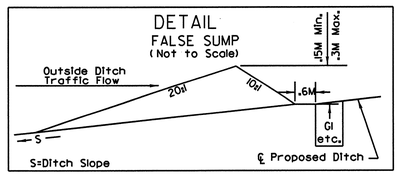


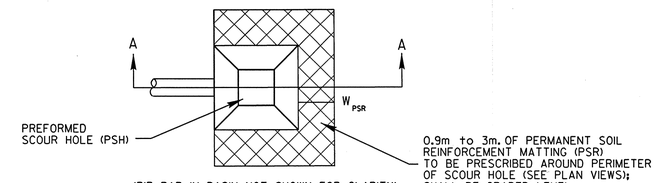
DETAIL
FALSE SUMP
(Not to Scale)



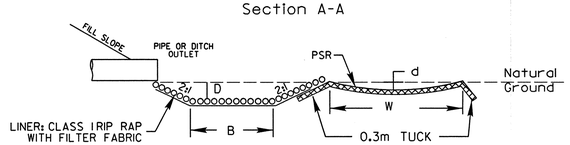
Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	6M	Over 4.0% To 6.0%	12M
Over 2.0% To 4.0%	9M	Over 6.0%	15M

DETAIL
FALSE SUMP
(Not to Scale)





Section A-A



NOTES:

1. 'B' DENOTES SIZE OF BASIN; FOR EXAMPLE: 1.5m x 1.5m PSH, B=1.5
2. THE PERMANENT SOIL REINFORCEMENT MATTING (PSR) SHALL BE SEEDED AT INSTALLATION IN ACCORDANCE WITH THE SEEDING SPECIAL PROVISION.

STATION	B M	D M	W_{PSR} M	d M	CLASS I RIP RAP MTONS	DDE M3	FILTER FABRIC M2
84+45 -L- LT	1.2	0.4	1.3	0.15	4.0	2.8	7.8

PREFORMED SCOUR HOLE WITH LEVEL SPREADER APRON
(Not to scale)

8/17/99

6/3/2010
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cpowell

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-L
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
CONST.REV.	
R /W REV.	

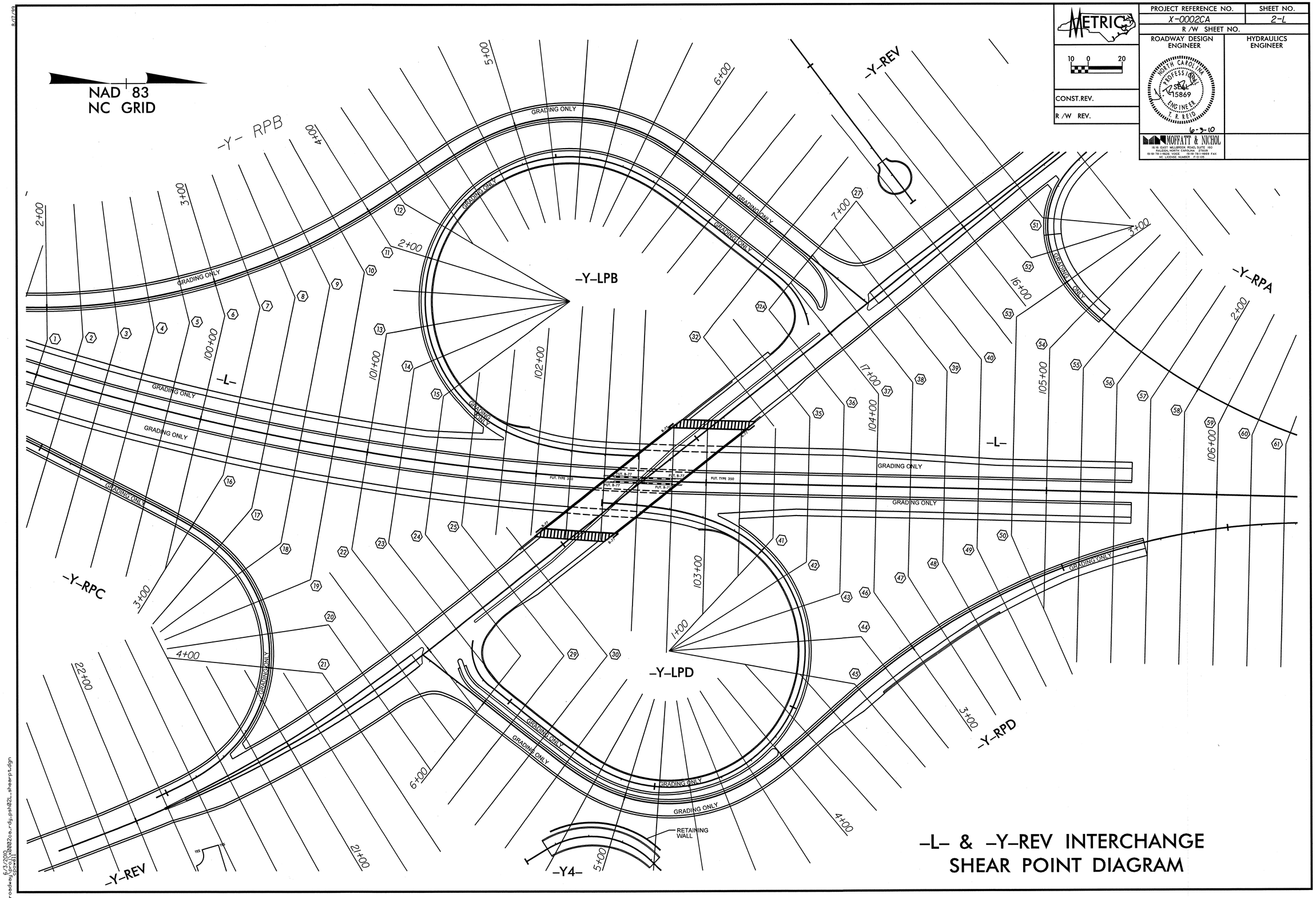
METRIC

10 0 20

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC LICENSE NUMBER F-0110



-L- & -Y-REV INTERCHANGE SHEAR POINT DIAGRAM

6/3/2010
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cpowell

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-M
R /W SHEET NO.	

METRIC

5 0 10 HORIZONTAL

1 0 2 VERTICAL

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER

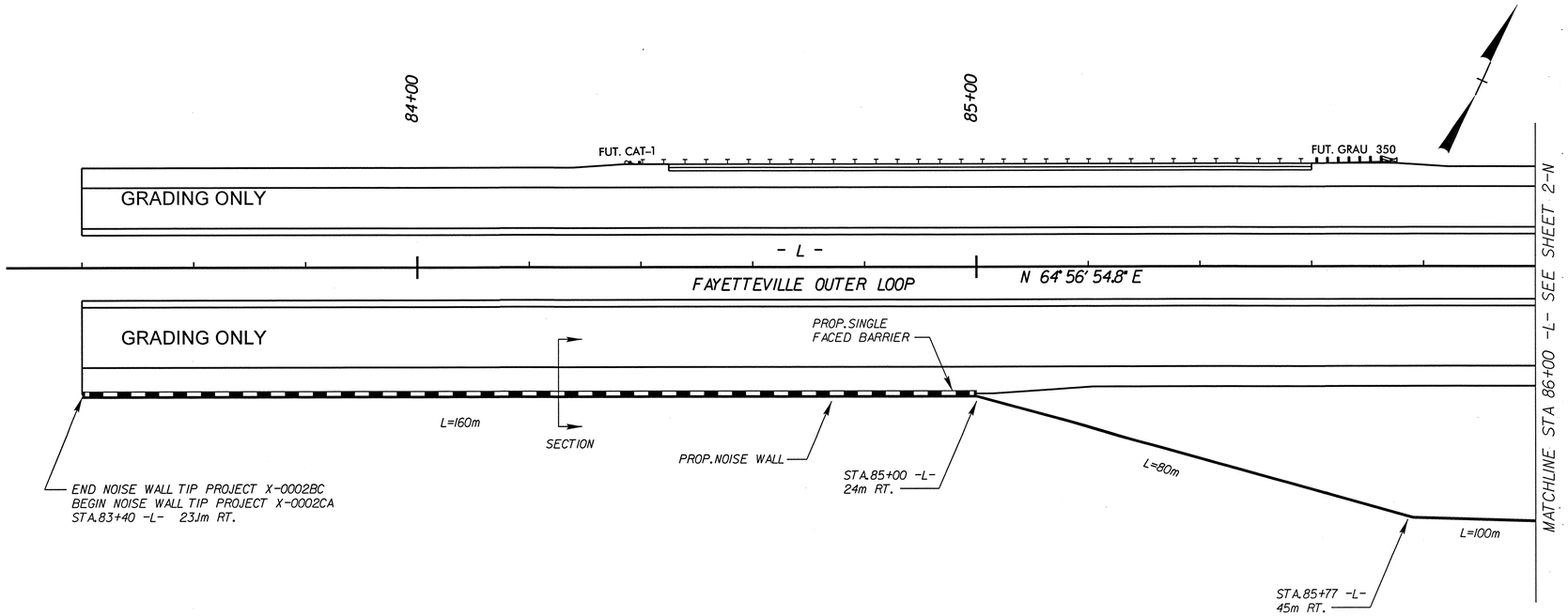
NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6/16/10

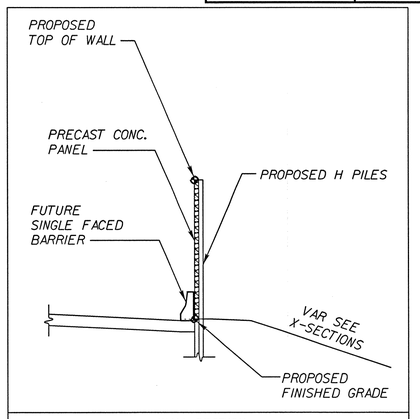
MOFFATT & NICHOL

1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC LICENSE NUMBER F-0105

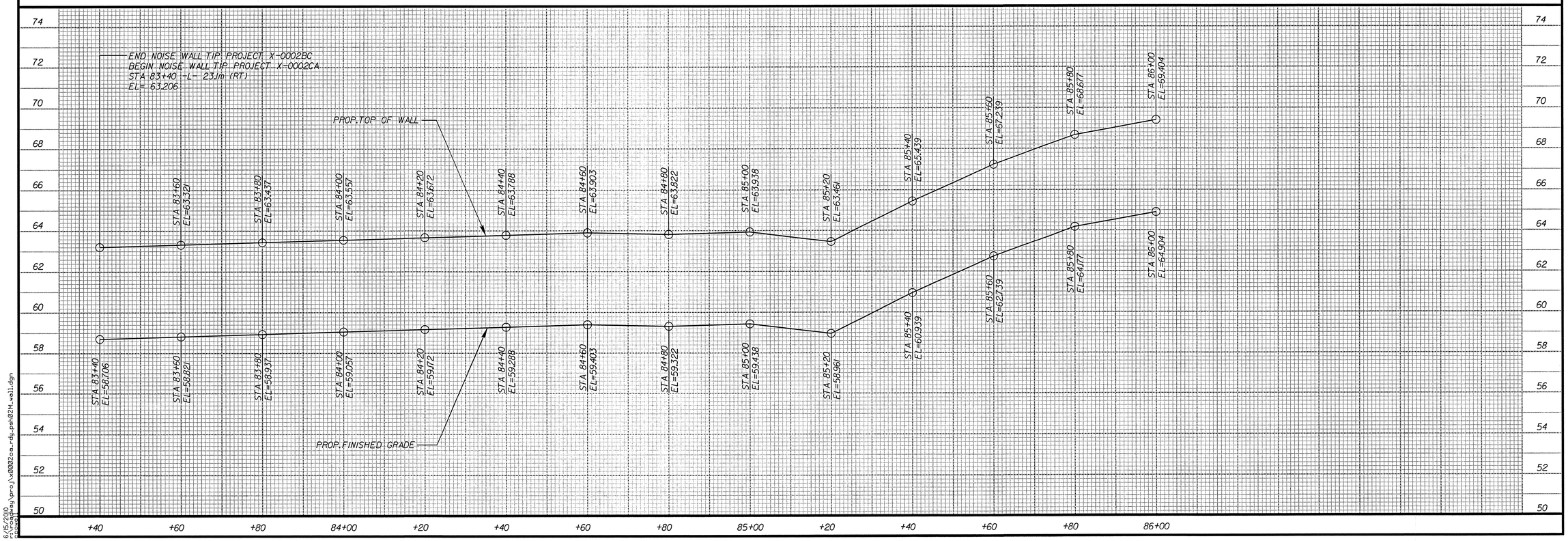
HYDRAULICS ENGINEER



SEE W-1 THRU W- FOR WALL PLANS



WALL SECTION



6/15/2010
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PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-N
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

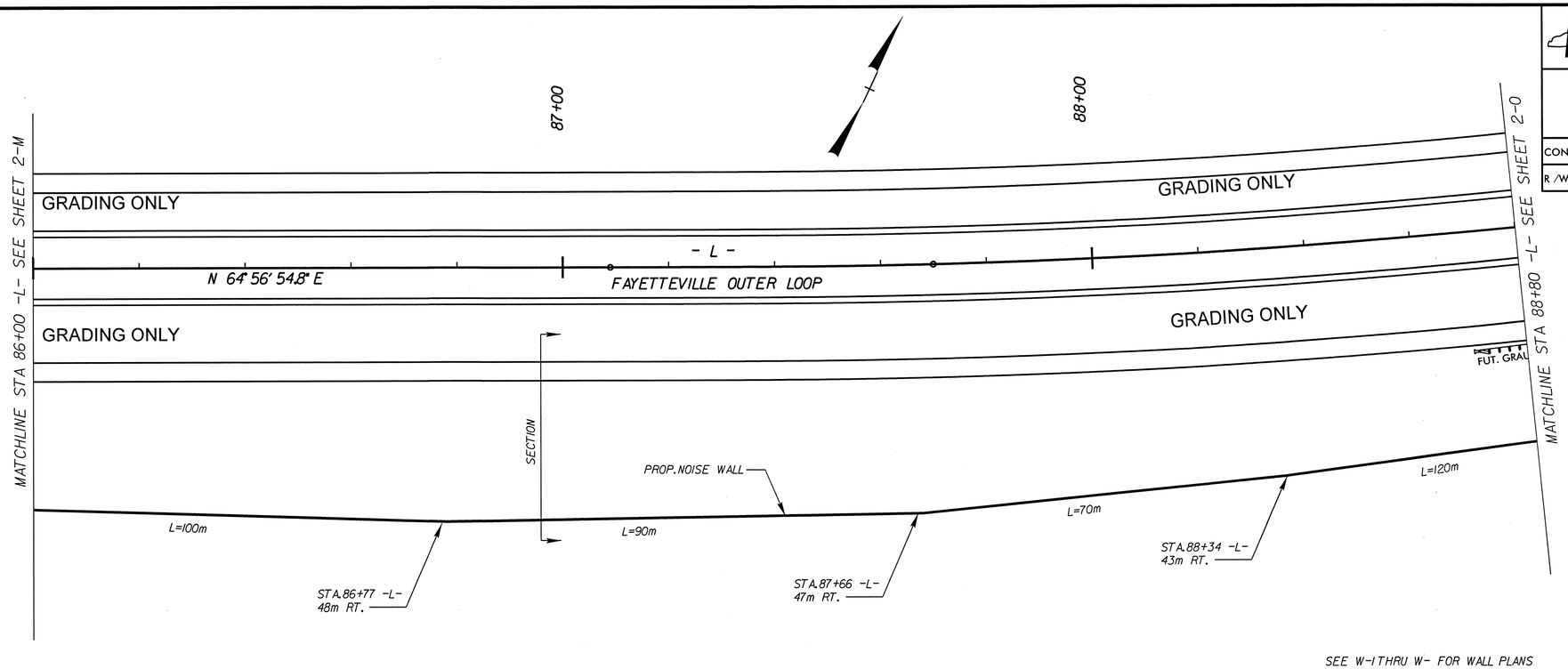
CONST.REV.

R /W REV.

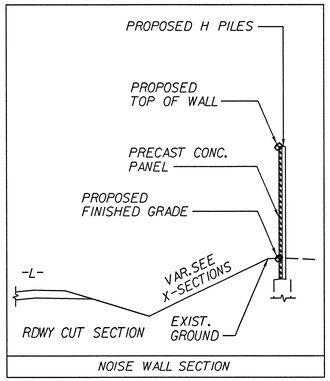
NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6/16/16

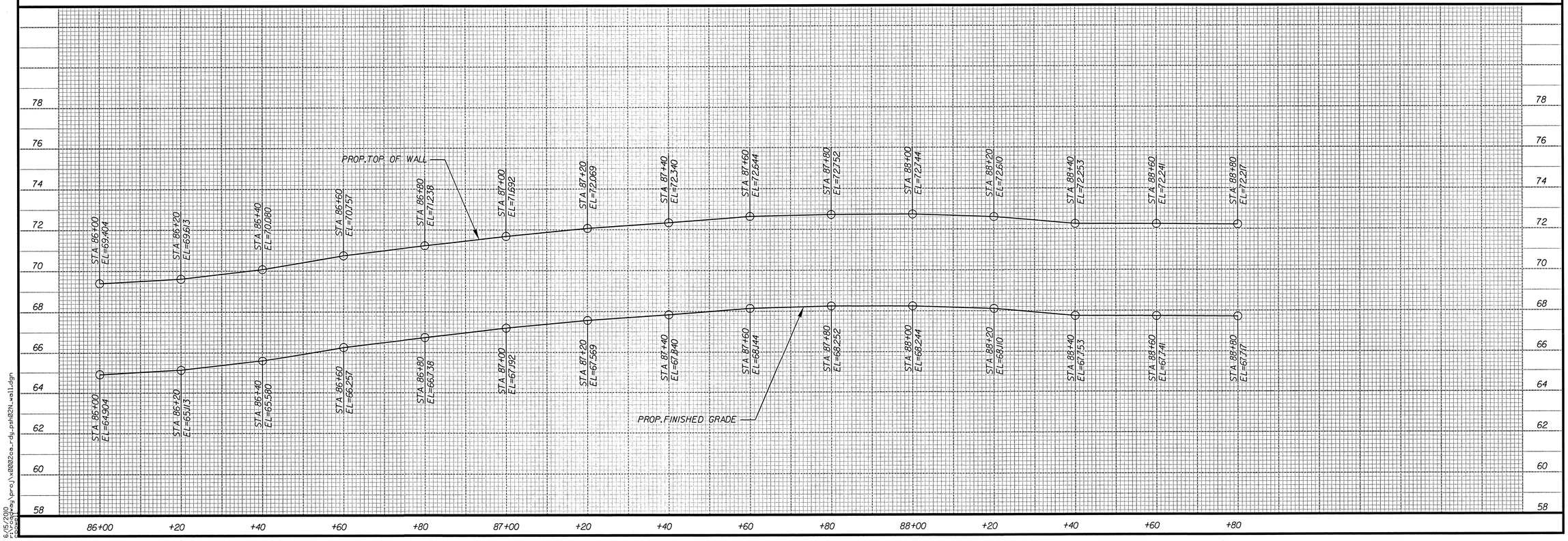
MOFFATT & NICHOL
16 W. EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-1022 (919) 781-1083 FAX
NC LICENSE NUMBER F-0105



SEE W-1 THRU W- FOR WALL PLANS



NOISE WALL SECTION



8/17/99

6/15/2010
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PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-0
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

METRIC

HORIZONTAL 5 0 10

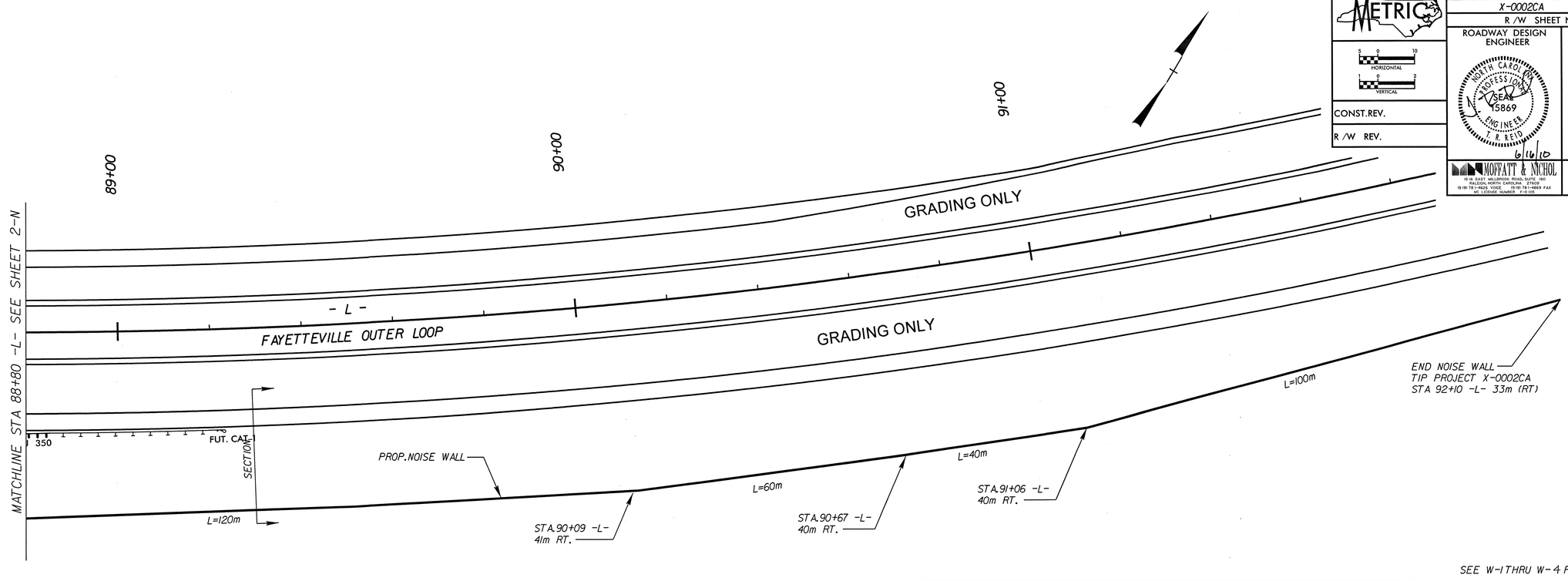
VERTICAL 1 0 2

CONST.REV.

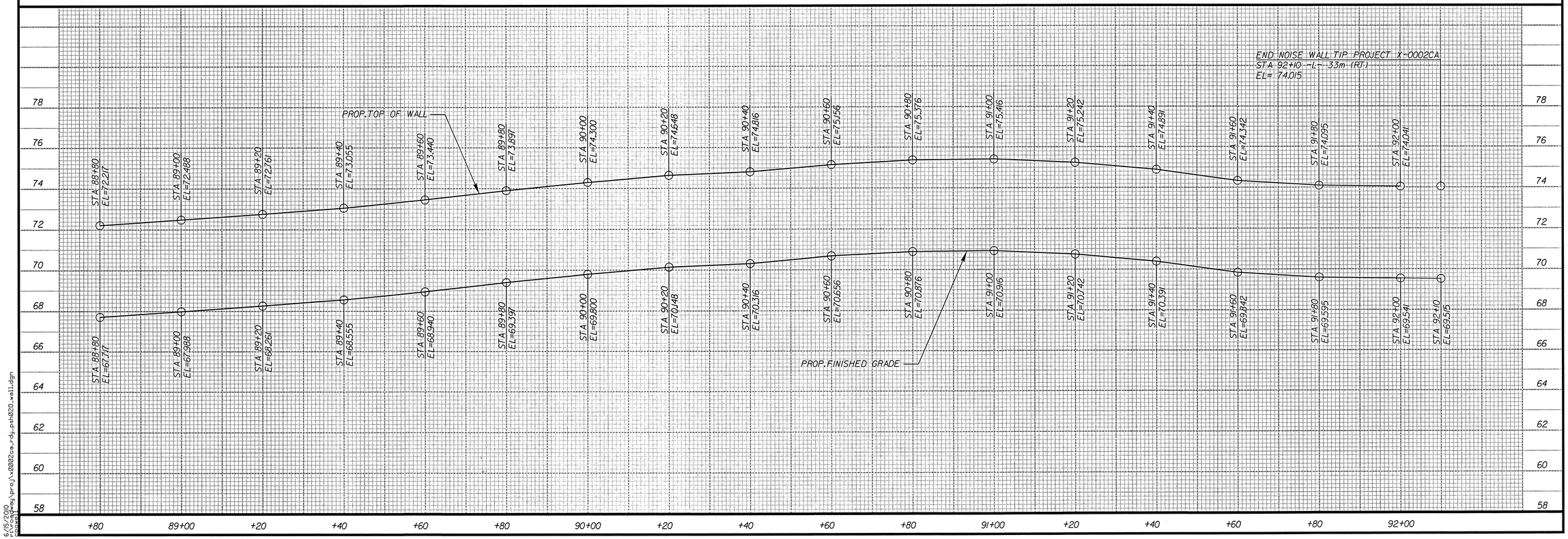
R /W REV.

NORTH CAROLINA PROFESSIONAL SEAL 13869 ENGINEER T. R. REID 6/16/10

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC LICENSE NUMBER #C-0205



SEE W-1 THRU W-4 FOR WALL PLANS



6/15/2010
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PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	Z-P

METRIC

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

METRIC DETAIL DRAWING FOR
CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS
375mm THRU 1200mm PIPE

SHEET 2 OF 2
838d02s1

GENERAL NOTES:

* ALL CORNERS TO BE CHAMFERED 25mm.
* THE CONTRACTOR WILL BE REQUIRED TO PLACE 2 - #19 BARS "Y" IN THE TOP OF ALL ENDWALLS FOR PIPE CULVERTS 1050mm AND OVER WITH A MINIMUM OF 75mm COVER AND A LENGTH OF 150mm LESS THAN ENDWALL.
* FORMS ARE TO BE USED FOR THE CONSTRUCTION OF THE BOTTOM SLAB.
* WALL THICKNESS (T) SHOWN IS NOT TO BE INTERPRETED TO MEAN THE THICKNESS ACCEPTABLE, BUT ARE USED ONLY IN COMPUTING ENDWALL QUANTITIES.
* IF CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE, BAR X (DOWELS SHALL BE PLACED IN THE BASE AS SHOWN ON PLANS. SPACING OF BARS TO BE APPROXIMATELY 300mm CENTER UNLESS ENGINEER DIRECTS OTHERWISE.
* WHEN CONTRACTOR ELECTS TO USE CONSTRUCTION JOINT AT BOTTOM OF PIPE AND POURS BASE SEPERATELY, THE TOP BASE SHALL BE LEFT ROUGH.
* WHEN SKEW ANGLE OF PIPE IS OVER/UNDER 30° USE G-1 DIMENSION FOR 30° PLUS/MINUS 152mm FOR EACH 5° OVER/UNDER 30°. G2 DIMENSION WILL BE THE NEW DIMENSION DIVIDED BY THE COSINE OF THE ANGLE OF PIPE SKEW.
* CLASS "B" CONCRETE SHALL BE USED.

**Note:
This drawing is dimensioned in millimeters unless otherwise depicted within the drawing.**

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

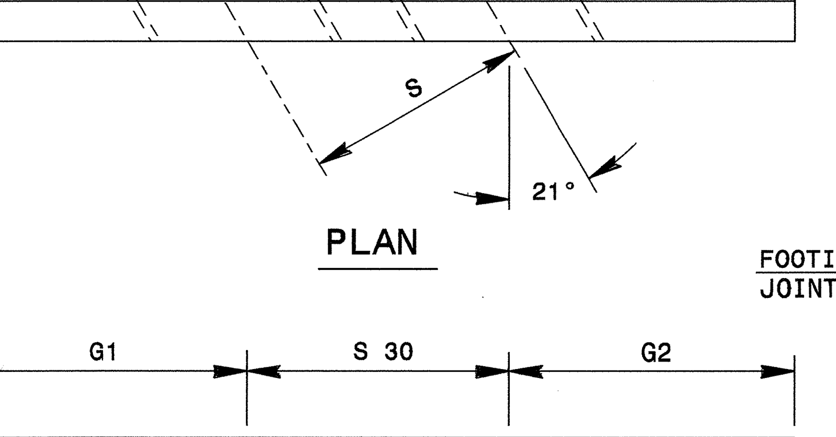
METRIC DETAIL DRAWING FOR
CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS
375mm THRU 1200mm PIPE

SHEET 2 OF 2
838d02s1

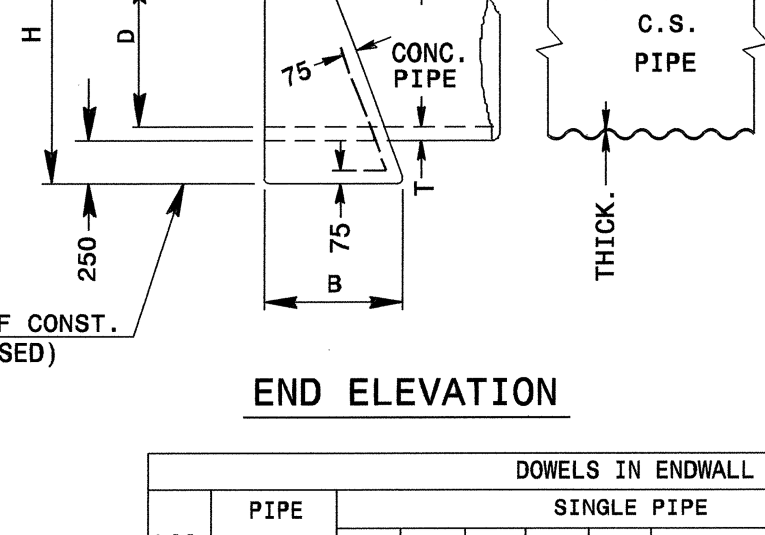
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

METRIC DETAIL DRAWING FOR
**CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS
375mm THRU 1200mm PIPE 69° SKEW**

SHEET 1 OF 2
838d02s1

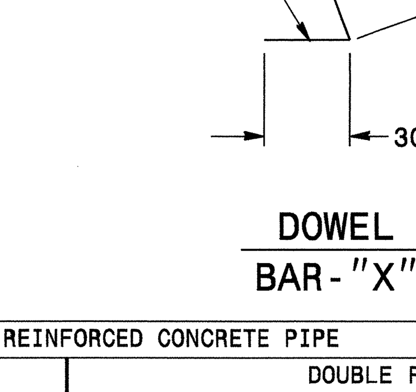


PLAN

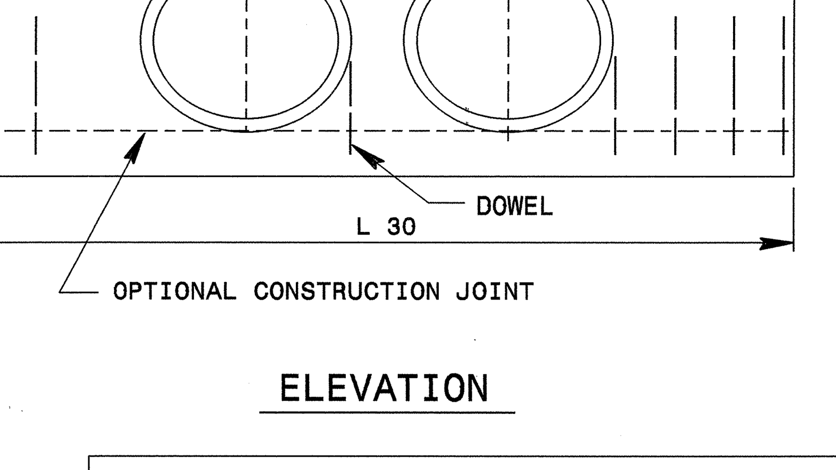


FOOTING (IF CONST. JOINT IS USED)

END ELEVATION



DOWEL
BAR-"X"



OPTIONAL CONSTRUCTION JOINT

ELEVATION

DOWELS IN ENDWALL WITH REINFORCED CONCRETE PIPE

LOC.	PIPE DIA.	SINGLE PIPE 375	450	600	750	900	1050		1200		DOUBLE PIPE 375	450	600	750	900	1050		1200	
	BARS	"X"	"X"	"X"	"X"	"X"	"X"	Y*	"X"	Y*	"X"	"X"	"X"	"X"	"X"	"X"	Y*	"X"	Y*
G1	QTY.	2	2	2	2	3	3	2	4	2	2	2	2	2	3	3	2	4	2
S	QTY.	-	-	-	-	-	-		-		/	/		2	2	2		3	
G2	QTY.	3	4	4	5	6	6		7		3	4	4	5	6	6		7	
TOT. kgs.		5.3	6.3	6.3	7.4	9.5	27.4		31.9		5.3	6.3	6.3	9.5	11.6	38.7		46.3	

DOWELS IN ENDWALL WITH CORRUGATED STEEL PIPE

LOC.	PIPE DIA.	SINGLE PIPE 400	450	600	800	900	1000		1200		DOUBLE PIPE 400	450	600	800	900	1000		1200	
	BARS	"X"	"X"	"X"	"X"	"X"	"X"	Y*	"X"	Y*	"X"	"X"	"X"	"X"	"X"	"X"	Y*	"X"	Y*
G1	QTY.	2	2	2	2	3	3	2	4	2	2	2	2	2	3	3	2	4	2
S	QTY.	-	-	-	-	-	-		-		/	/	/	/	2	2		2	
G2	QTY.	3	3	4	5	5	6		7		3	3	4	5	5	6		7	
TOT. kgs.		5.3	5.3	6.3	7.4	8.4	26.1		30.4		5.3	5.3	6.3	7.4	10.5	36.6		42.1	

DIMENSIONS AND CONCRETE QUANTITIES

USING CONCRETE PIPE

D	COMMON DIMS. H	B	T	SINGLE PIPE G1	G2	L 30	m^3	DOUBLE PIPE G1	G2	S	S 30	L 30	m^3
375	1016	508	48	838	965	1803	0.598	838	965	660	762	2565	0.806
450	1092	559	51	965	1118	2083	0.782	968	1121	787	908	2997	1.063
600	1270	635	63	1219	1422	2642	1.233	1219	1422	1041	1206	3861	1.687
750	1448	737	70	1397	1626	3023	1.750	1397	1626	1295	1492	4521	2.436
900	1600	813	76	1676	1930	3607	2.462	1686	1940	1524	1759	5385	3.400
1050	1778	889	89	1930	2235	4166	3.345	1930	2235	1778	2051	6223	4.597
1200	1956	991	102	2184	2515	4699	4.266	2191	2521	2032	2343	7061	6.164

USING CORRUGATED STEEL PIPE

D	COMMON DIMS. H	B	SINGLE PIPE G1	G2	L 30	m^3	DOUBLE PIPE G1	G2	S	S 30	L 30	m^3
375	914	457	762	889	1651	0.471	762	889	610	711	2362	0.648
450	991	508	889	1016	1905	0.624	892	1019	698	806	2718	0.848
600	1143	584	1118	1295	2413	0.980	1124	1302	914	1054	3480	1.336
750	1295	660	1346	1549	2896	1.428	1349	1553	1118	1289	4191	1.935
900	1448	737	1575	1829	3404	2.004	1584	1838	1372	1581	5004	2.749
1050	1600	813	1803	2083	3886	2.689	1807	2086	1600	1848	5740	3.685
1200	1753	889	2032	2337	4369	3.510	1991	2296	1829	2115	6502	4.832

*SEE SHEET 2

**Note:
This drawing is dimensioned in millimeters unless otherwise depicted within the drawing.**

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

METRIC DETAIL DRAWING FOR
CONCRETE ENDWALL FOR SINGLE AND DOUBLE PIPE CULVERTS
375mm THRU 1200mm PIPE 69° SKEW

SHEET 1 OF 2
838d02s1

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 022966 JOE S. HOWERTON 6/22/10

**PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN**
Office 919-250-4128 FAX 919-250-4119

SEE PLATE FOR TITLE

ORIGINAL BY: T.S. SPELL DATE: 4-17-99
MODIFIED BY: DATE:
CHECKED BY: DATE: 6/3/10
FILE SPEC.: /usr/details/metric/stand/838d02s1.dgn

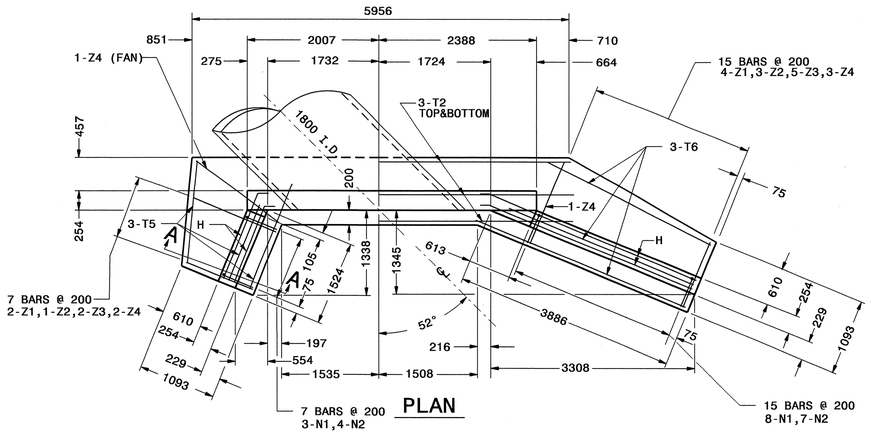
PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-Q

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

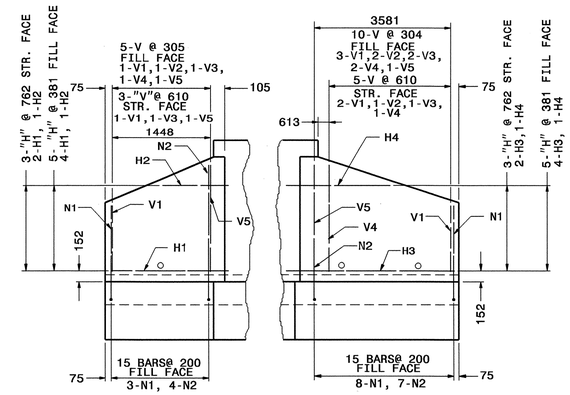
ENGLISH DETAIL DRAWING FOR
REINFORCED CONCRETE ENDWALL
FOR SINGLE 1800 PIPE 52° SKEW

SHEET 1 OF 1

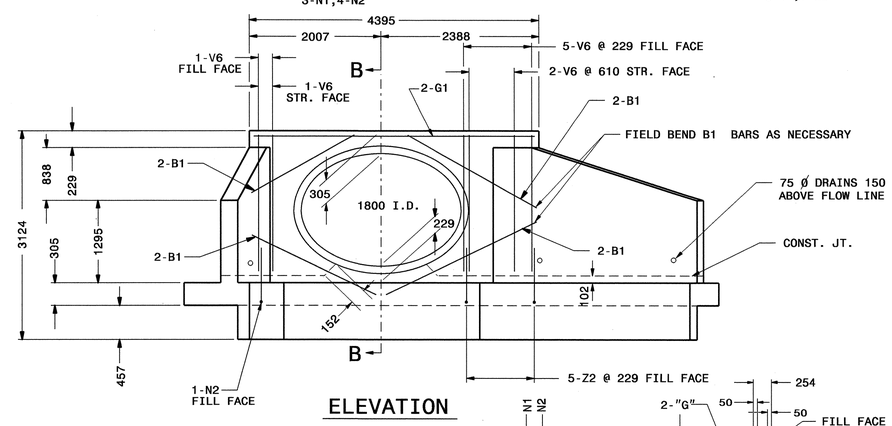
838D43



PLAN



WING ELEVATION



ELEVATION

NOTES:

ALL CONCRETE TO BE CLASS "A".

ALL REINFORCING STEEL SHALL BE ASTMA615-GRADE 60.

ALL REINFORCING STEEL SHALL BE DEFORMED BARS. WHERE SPLICING OF REINFORCMENT IS NECESSARY, BARS ARE TO BE LAPPED 45 DIAMETERS. ALL DIMENSIONS RELATIVE TO REINFORCEMENT ARE TO CENTERS OF BARS.

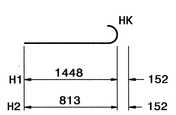
THE FOOTING, CURTAIN WALL AND 102mm OF WALL ARE TO BE POURED IN ONE OPERATION ALLOWING NO TIME FOR INITIAL SET TO TAKE PLACE BETWEEN THEM. THE REMAINING WALL SHALL THEN BE POURED IN ONE OPERATION.

ALL EXPOSED CORNERS ARE TO BE CHAMFERED 25mm.

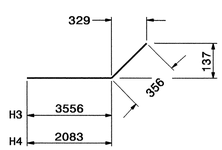
75mm DIAMETER DRAINS SHALL BE PLACED IN WALL AS SHOWN AND BE 150mm ABOVE NORMAL FLOW LINE.

ALL MATERIAL AND WORKMANSHIP AS PER N.C.DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS.

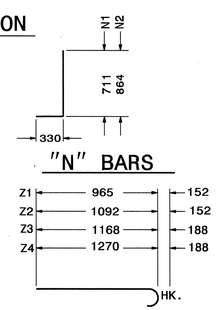
BILL OF MATERIAL FOR ENDWALLS				
REINF. STEEL			1 - PIPES	
BAR	SIZE	LENGTH	NO.	WEIGHT
Z1	#13	1118	6	7
Z2	#13	1245	4	5
Z3	#16	1362	7	15
Z4	#16	1478	6	14
N1	#13	1041	11	11
N2	#16	1194	17	31
V1	#13	1168	7	5
V2	#13	1372	4	5
V3	#13	1549	5	8
V4	#13	1727	4	7
V5	#13	1905	3	6
V6	#13	2210	9	20
H1	#13	1600	6	10
H2	#13	965	2	2
H3	#13	3912	6	23
H4	#13	2438	2	5
G1	#22	4293	2	26
T1	#13	762	56	43
T2	#13	5842	6	35
T5	#13	1600	3	5
T6	#13	3048	3	9
B1	#13	1981	8	16
REINF. STEEL kgs.				308
CONC/C.M. CU. M.				7.6
CONC/R.C. CU. M.				7.2



"H" BARS

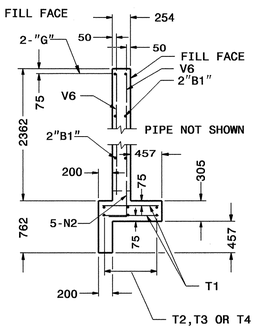


"H" BARS

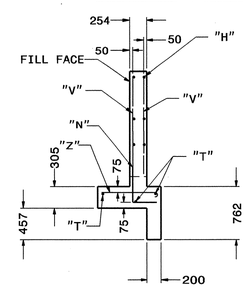


"N" BARS

"Z" BARS



SECTION - BB



SECTION - AA

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH DETAIL DRAWING FOR
REINFORCED CONCRETE ENDWALL
FOR SINGLE 1800 PIPE 52° SKEW

SHEET 1 OF 1

838D43

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER JOHN S. WICKER
6/22/10

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

DETAIL OF REINFORCED CONCRETE ENDWALL FOR 1800 DIAMETER PIPE - 52° SKEW

ORIGINAL BY: R.S.WICKER DATE: 6-46
MODIFIED BY: rabritt DATE: 06-02-10
CHECKED BY: DATE: 6/3/10
FILE SPEC.: details/nbritt/english/hydro/72endwall,45sk.dgn

03-JUN-2010 15:52
$$$$USERNAME$$$$
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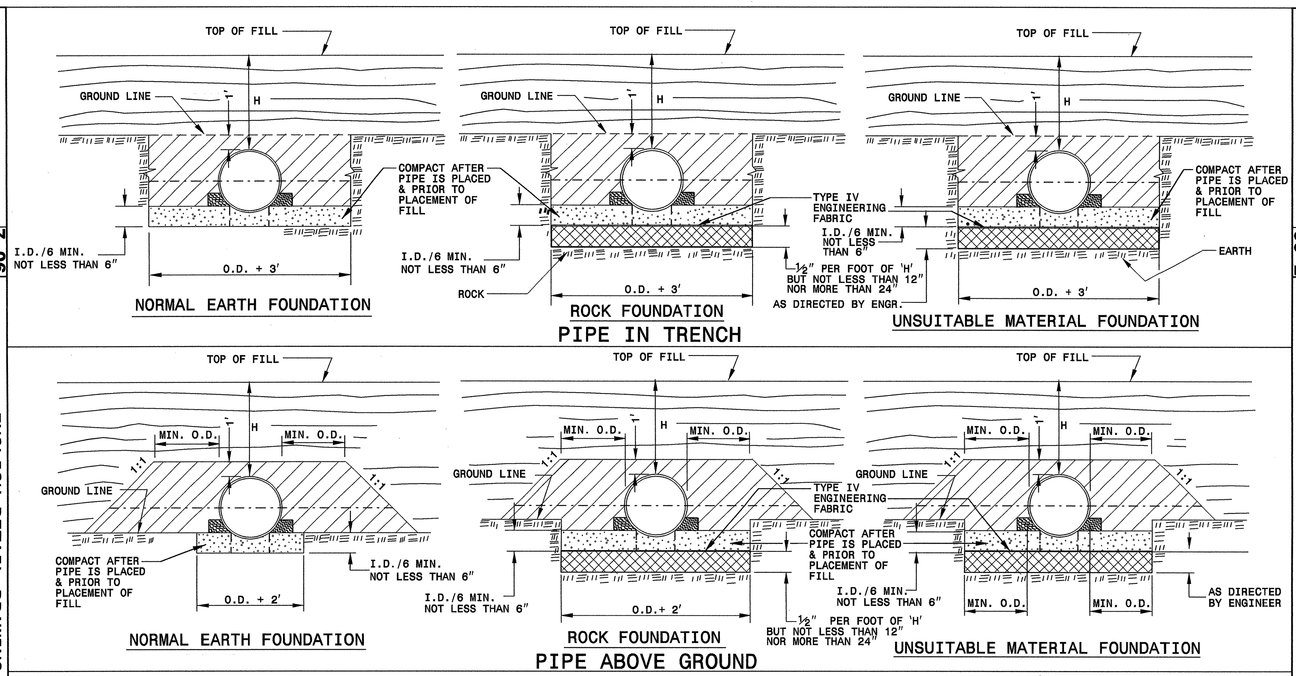
30-JUL-2009 08:48
s:\contracts\contracts\special details\ericward\stds\06' stds to special details\30001\0300d01.dgn
jhowerton AT PS23750l

5/14/99

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FLEXIBLE PIPE



GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, TYPE 1 ABOVE AND BELOW SPRINGLINE.

APPROVED SUITABLE LOCAL MATERIAL.

UNDISTURBED EARTH MATERIAL

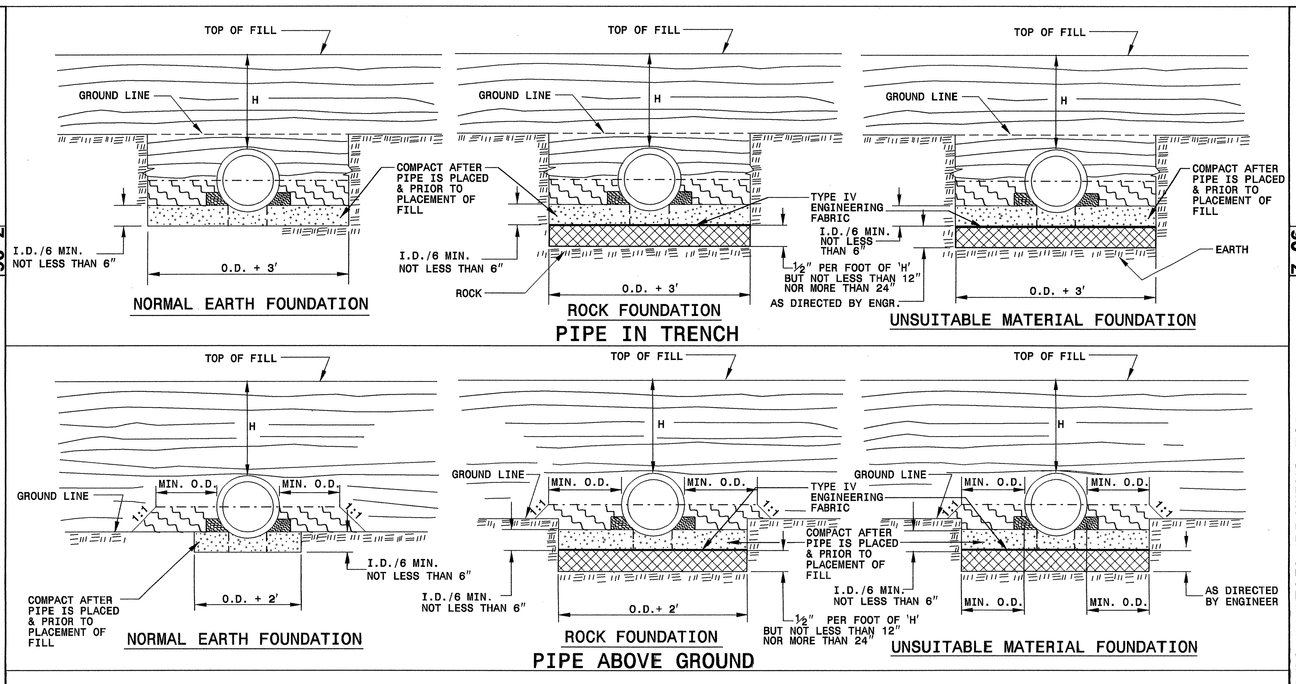
SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

SHEET 1 OF 3
300D01

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
RIGID PIPE



GENERAL NOTES:

I.D. = THE MAXIMUM HORIZONTAL INSIDE DIAMETER DIMENSION.

O.D. = THE MAXIMUM HORIZONTAL OUTSIDE DIAMETER DIMENSION.

H = THE FILL HEIGHT MEASURED VERTICALLY AT ANY POINT ALONG THE PIPE FROM THE TOP OF THE PIPE TO THE TOP OF THE EMBANKMENT AT THAT POINT.

TAKE CARE TO FULLY COMPACT HAUNCH ZONE OF PIPE BACKFILL.

LOOSELY PLACED SELECT MATERIAL CLASS III OR CLASS II, TYPE 1 FOR PIPE BEDDING. LEAVE SECTION DIRECTLY BENEATH PIPE UNCOMPACTED AS PIPE SEATING AND BACKFILL WILL ACCOMPLISH COMPACTION.

DO NOT OPERATE HEAVY EQUIPMENT OVER ANY PIPE CULVERT UNTIL THE PIPE CULVERT HAS BEEN PROPERLY BACKFILLED AND COVERED WITH AT LEAST 3 FEET OF APPROVED MATERIAL.

SPRINGLINE OF PIPE

SELECT BACKFILL MATERIAL CLASS III OR CLASS II, BELOW SPRINGLINE.

APPROVED SUITABLE LOCAL MATERIAL ABOVE SPRINGLINE.

UNDISTURBED EARTH MATERIAL

SELECT MATERIAL CLASS V OR VI FOR FOUNDATION CONDITIONING. ENCAPSULATE WITH ENGINEERING FABRIC AS DIRECTED BY THE ENGINEER.

SHEET 2 OF 3
300D01

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

ORIGINAL BY: Kempf DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: DATE: 7/9/09
FILE SPEC: s:\contracts\contracts\specialdetails\30001\0300d01.dgn

SEE PLATE FOR TITLE

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER
LOCAL ENGINEER'S CERTIFICATION
4/22/10

PROJECT REFERENCE NO. X-0002CA
SHEET NO. 2-R

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

FLEXIBLE PIPE

Round Corrugated Steel Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (Ga) 16	14	12	10	8
12	12	204	256			
15	12	162	204			
18	12	135	169	239		
21	12	115	145	204		
24	12	100	126	178		
30	12	79	100	142		
36	12	65	83	117	152	
42	12	55	70	100	130	160
48	12	48	61	87	113	139
54	12		54	77	100	123
60	12			69	90	111
66	12				81	100
72	12				74	91
78	12					81
84	12					69

Round Corrugated Aluminum Pipe
2 2/3 x ½ corrugation **

Diameter (inches)	Minimum cover (inches)	Maximum Height of Cover (feet) (Ga) 16	14	12	10	8
12	12	123	155	218	281	344
15	12	98	123	174	224	275
18	12	81	102	144	187	228
21	12	69	87	123	160	195
24	12	60	76	108	139	171
27	12		67	95	123	151
30	12		60	85	111	136
36	12		50	71	92	113
42	12			60	78	96
48	12			52	68	84
54	12			46	50	74
60	12				50	62
66	12					51
72	12					41

** FOR DIFFERENT CORRUGATIONS AND ARCH PIPES REFER TO ROADWAY DESIGN MANUAL OR MANUFACTURERS SPECIFICATION.

HDPE - * (Minimum fill) 2′ for pipe diameters ≥ 12″ and ≤ 60″
* (Maximum fill) 20′ for pipe diameters ≤ 24″
17′ for pipe diameters ≥ 30″ and ≤ 60″

PVC - * (Minimum fill) 2′ for pipe diameters ≥ 12″ and ≤ 36″
* (Maximum fill) 30′ for pipe diameters ≥ 12″ and ≤ 36″

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

CSP - AASHTO M36
CAAP - AASHTO M196
HDPE - AASHTO M294
PVC - ASTM F949 or AASHTO M304

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1′ MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

RIGID PIPE

RCP - * (Minimum fill) 1′ for Class IV & CLASS V
2′ for Class III & Class II

* (Maximum fill) 10′ - Class II pipe
20′ - Class III pipe
30′ - Class IV pipe
40′ - Class V pipe

(For fills > 40′ & < 80′ use LRFD Direct Design Method)

* FILL HEIGHT IS MEASURED FROM THE TOP OF THE PIPE TO THE BOTTOM OF THE PAVEMENT STRUCTURE

REFER TO THE FOLLOWING FOR PIPE SPECIFICATIONS

RCP - AASHTO M170

NOTES: FILL HEIGHTS SHOWN WERE CALCULATED USING AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS

1′ MINIMUM COVER FOR ALL SIDE DRAIN PIPE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS

STATE OF NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

7-06

ENGLISH DETAIL DRAWING FOR
METHOD OF PIPE INSTALLATION
FILL HEIGHT TABLES

SHEET 3 OF 3
300D01

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 02966 JOHN L. HOWERTON 4/22/10

SEE PLATE FOR TITLE

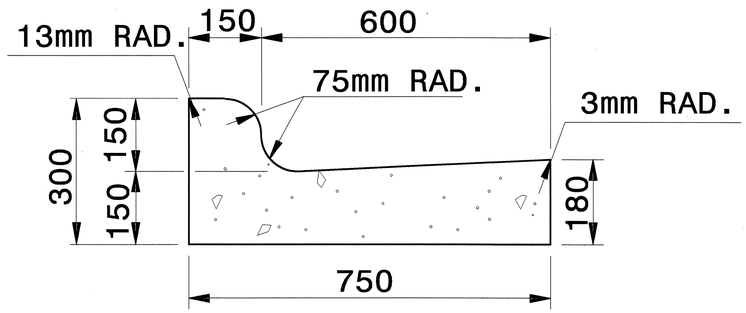
ORIGINAL BY: KKempf DATE: 5-15-09
MODIFIED BY: DATE:
CHECKED BY: DATE: 7/9/09
FILE SPEC: s:\contracts\contracts\specialdetails\stds\06stds\30001\0300d01.dgn

PROJECT REFERENCE NO. X-0002CA
SHEET NO. 2-S

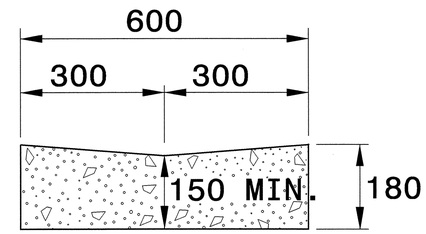
PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	2-T

METRIC

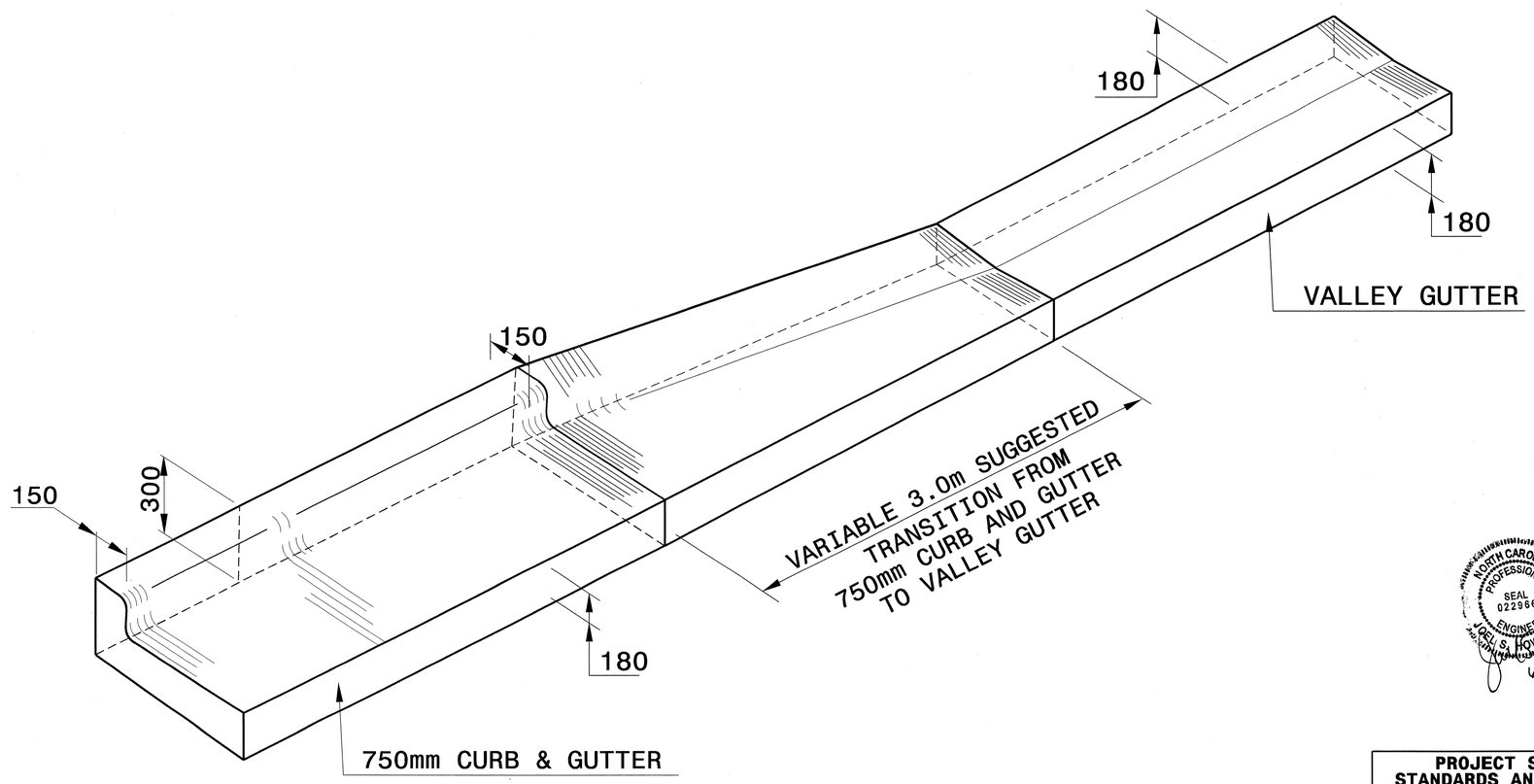
*NOTE: SEE STD. DWG. 846.01
FOR GENERAL NOTES



750mm CURB AND GUTTER



VALLEY GUTTER



Note:
This drawing is dimensioned in millimeters unless otherwise depicted within the drawing.

ISOMETRIC VIEW OF TRANSITION

NORTH CAROLINA PROFESSIONAL SEAL 022966 ENGINEER T. S. HOWARD
6/22/10

PROJECT SERVICES UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

TRANSITION FROM 750mm CURB AND GUTTER TO VALLEY GUTTER

ORIGINAL BY: T.S.SPELL DATE: FEB.4,2009
MODIFIED BY: DATE:
CHECKED BY: DATE: 6/16/10
FILE SPEC.: w:usr/details/stand/cgtransit.dgn

16-JUN-2010 12:18
S:\Contracts\Contracts\Special Details\ericward\usr\details\stand\cgtransit.dgn
$$$$USERNAME$$$$

COMPUTED BY: Chris Powell DATE: 3/8/2010

CHECKED BY: Trent Huffman DATE: 3/14/2010

RA-0239

6962476

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
X-0002CA	3

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 1200mm & UNDER)

STATION	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 300	375	450	600	750	900	900 CLASS V	1050	1050 CLASS IV	1200
-L-																	
84+45	LT	1		59.29	57.92												
84+45	LT	1	OUT		57.92	55.50											
84+45	CL	2		58.82	57.98												
84+45	CL	2	1		57.98	57.92			16.8								
85+25	RT	4		58.75	57.91												
85+25	RT	4	OUT		57.91	56.90											
Structure Number 5 Not Used																	
-L-																	
85+80	LT	6		59.20	56.57												
85+80	LT	6	OUT		56.57	56.50											
85+80	CL	7		59.64	57.80												
85+80	CL	7	6		57.80	57.60						22.8					
85+80	RT	8		59.11	58.04												
85+80	RT	8	7		58.04	57.95					27.6						
86+20	RT	9		59.52	58.61												
86+20	RT	9	8		58.61	58.20											
86+20	RT	10			64.99												
86+20	RT	10	9		64.99	58.61											
87+20	LT	11		61.04	60.13												
87+20	LT	11	12		60.13	60.06				22.8							
87+20	CL	12		61.51	59.76												
87+20	CL	12	7		59.91	57.80											
87+20	RT	13		61.33	60.49												
87+20	RT	13	12		60.49	60.13			26.4								
88+60	LT	14		63.01	62.10												
88+60	LT	14	15		62.10	62.03				22.8							
88+60	CL	15		63.64	61.73												
88+60	CL	15	12		61.73	59.76											
86+60	RT	16		63.85	62.94												
86+60	RT	16	15		62.94	62.03				25.2							
88+60	RT	17			67.00												
88+60	RT	17	16		67.00	62.74											
88+90	LT	18		64.96	64.12												
88+90	LT	18	19		64.12	64.04			22.8								
88+90	CL	19		65.59	63.96												
88+90	CL	19	15		63.96	61.88											
88+90	RT	20		65.80	64.96												
88+90	RT	20	19		64.96	64.04			26.4								
91+20	LT	21		66.74	65.90												
91+20	LT	21	22		65.90	65.82			25.2								
91+20	CL	22		67.49	65.82												
91+20	CL	22	19		65.82	64.04											
91+20	RT	23		67.70	66.86												
91+20	RT	23	22		66.86	65.82			25.2								
SHEET TOTALS									142.8	70.8	27.6	22.8					

STATION	LOC.	FROM	TO	C.S. PIPE (UNLESS NOTED OTHERWISE) 300 (1.63)	400 (1.63)	450 (1.63)	600 (1.63)	800 (2.01)	900 (2.01)	1000 (2.01)	1200 (2.01)	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D 300	375	450	600	750	900	1050	1200
84+45	LT	1	OUT		13.2														
85+25	RT	4	OUT										21.6						
85+80	LT	6	OUT														22.8		
86+20	RT	9	8											38.4					
86+20	RT	10	9			21.6													
87+20	CL	12	7													139.2			
88+60	CL	15	12													139.2			
88+60	RT	17	16			18.0													
88+90	CL	19	15												128.4				
91+20	CL	22	19										128.4						
SHEET TOTALS					13.2	39.6							150.0	38.4	128.4	278.4	22.8		

STATION	LOC.	FROM	TO	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. METERS R.C.P.	C.S.P.	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	*TOTAL METERS FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') METERS A 1.5 THRU 3.00	B 3.00 AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. FRAME WITH ONE GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.20	G.D.I. FRAME WITH TWO GRATES STD. 840.22
84+45	LT	1							1										1		1	
84+45	CL	2							1										1			1
85+25	RT	4							1										1			1
85+80	LT	6							1	1.13								1				1
85+80	CL	7							1	0.34								1				1
85+80	RT	8							1										1			1
86+20	RT	9							1										1			1
87+20	LT	11							1										1			1
87+20	CL	12							1	0.25								1				1
87+20	RT	13							1										1			1
88+60	LT	14							1										1			1
88+60	CL	15							1	0.41								1				1
86+60	RT	16							1										1			1
88+90	LT	18							1										1			1
88+90	CL	19							1	0.13								1				1
88+90	RT	20							1										1			1
91+20	LT	21							1										1			1
91+20	CL	22							1	0.17									1			1
91+20	RT	23							1										1			1
SHEET TOTALS									19	2.43								5	14		1	18
										2.43												

STATION	LOC.	FROM	TO	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	M.H. FRAME AND COVER STD. 840.54	PAVED DITCH m2 STD. 850.10	OPEN THROAT C.B. STD. 840.04 OR 840.05	C.S. ELBOWS NO. & SIZE 400	450	600	800	900	1000	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" M^3 STD. 840.72	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	PIPE REMOVAL (METERS)	REMARKS
84+45	LT	1	OUT									2										ROD AND LUG CONN. W/ SLEEVE GASKET
86+20	RT	10								10												BERM DITCH OUTLET
86+20	RT	10	9										1									
88+60	RT	17								10												BERM DITCH OUTLET
88+60	RT	17	16										1									
SHEET TOTALS										20		2	2									SHEET TOTALS

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

RA-0239

COMPUTED BY: Chris Powell DATE: 3/8/2010

CHECKED BY: Trent Huffman DATE: 3/14/2010

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
X-0002CA	3-A

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 1200mm & UNDER)

STATION	LOCATION (LT, RT, OR CL)[1]	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) SIZE	300	375	450	600	750	900	900	1050	1050	1200
THICKNESS OR GAUGE															CLASS V		CLASS IV	
-L-																		
92+20	CL	24		68.24	67.40													
92+20	CL	24	29		67.40	67.14												
92+80	LT	25		68.66	67.82													
92+80	LT	25	28		67.82	67.74												
93+05	LT	28		68.66	67.74													
93+05	LT	28	29		67.74	67.14				20.4								
93+05	CL	29		68.79	67.14													
93+05	CL	29	OUT		67.14	65.00				33.6								
93+00	RT	26		67.30	63.12													
93+00	RT	26	OUT		63.12	62.90										70.8		
93+00	RT	27			64.20													
93+00	RT	27	26		64.20	64.15												
		IN	30	67.30	66.35								32.4					
94+72	CL	30		69.31	66.20													
94+72	CL	30	OUT		66.20	66.10								31.2				
95+65	CL	31		69.96	66.63													
95+65	CL	31	30		66.63	66.35												
97+75	LT	32		68.58	67.74													
97+75	LT	32	33		67.74	67.64				32.4								
97+75	CL	33		69.96	67.26													
97+75	CL	33	31		67.26	66.63												
99+00	CL	34		69.34	67.89													
99+00	CL	34	33		67.89	67.41												
99+00	RT	35		69.62	68.35													
99+00	RT	35	34		68.35	67.89						30.0						
1+82, -Y-RPC	RT	36		69.50	68.43													
1+82, -Y-RPC	RT	36	35		68.43	68.35						22.8						
-L-																		
100+30	LT	37		68.06	67.22													
100+30	LT	37	38		67.22	67.15				22.8								
100+30	CL	38		68.69	66.93													
100+30	CL	38	41		66.93	66.36												
100+30	RT	39		68.90	68.06													
100+30	RT	39	38		68.06	67.15				28.8								
101+40	LT	40		67.51	66.67													
101+40	LT	40	41		66.67	66.58				30.0								
101+60	CL	41		68.04	66.36													
101+60	CL	41	45		66.36	65.50												
101+60	RT	42		68.25	67.41													
101+60	RT	42	41		67.41	66.58				26.4								
19+20, -Y-REV	RT	43		76.56	75.59													
19+20, -Y-REV	RT	43	42		75.59	67.41												
102+20, -L-	LT	44		66.64	65.80													
102+20, -L-	LT	44	45		65.80	65.72				28.8								
SYSTEM CONTINUES ON NEXT SHEET																		
SHEET TOTALS										223.2		52.8	32.4	31.2		70.8		

STATION	C.S. PIPE (UNLESS NOTED OTHERWISE) SIZE	300	400	450	600		800		900		1000		1200	
THICKNESS OR GAUGE		1.63	1.63	1.63	1.63		2.01		2.01		2.01		2.01	
-L-														
92+20														
92+20														
92+80														
92+80														
93+05														
93+05														
93+05														
93+05														
93+00														
93+00														
93+00														
93+00														
94+72														
94+72														
95+65														
95+65														
97+75														
97+75														
97+75														
97+75														
99+00														
99+00														
99+00														
99+00														
1+82, -Y-RPC														
1+82, -Y-RPC														
-L-														
100+30														
100+30														
100+30														
100+30														
100+30														
100+30														
101+40														
101+40														
101+60														
101+60														
101+60														
101+60														
19+20, -Y-REV														
19+20, -Y-REV			44.4											
102+20, -L-														
102+20, -L-														
SYSTEM CONTINUES ON NEXT SHEET														
SHEET TOTALS			44.4											

STATION	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D SIZE	300	375	450	600	750	900	1050	1200	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. METERS R.C.P.	C.S.P.
-L-														
92+20														
92+20			84.0											
92+80														
92+80			21.6											
93+05														
93+05														
93+05														
93+05														
93+00														
93+00														
93+00														
93+00								3.6					3.4	
94+72														
94+72														
95+65														
95+65						91.2								
97+75														
97+75														
97+75														
97+75						208.8								
99+00														
99+00					123.6									
99+00														
99+00														
1+82, -Y-RPC														
1+82, -Y-RPC														
-L-														
100+30														
100+30														
100+30														
100+30					128.4									
100+30														
100+30														
101+40														
101+40														
101+60														
101+60					58.8									
101+60														
101+60														
19+20, -Y-REV														
19+20, -Y-REV														
102+20, -L-														
102+20, -L-														
SYSTEM CONTINUES ON NEXT SHEET														
SHEET TOTALS			105.6		310.8	300.0		3.6					3.4	

STATION	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	METERS A 1.5 THRU 3.00	METERS B 3.00 AND ABOVE	*TOTAL METERS FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B')	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	G.D.I. TYPE 'A' STD. 840.17 OR 840.26	G.D.I. TYPE 'B' STD. 840.18 OR STD. 840.27	G.D.I. FRAME WITH ONE GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.20	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	M.H. FRAME AND COVER STD. 840.54	PAVED DITCH m2 STD. 850.10	OPEN THROAT C.B. STD. 840.04 OR 840.05	C.S. ELBOWS NO. & SIZE 400	450	600	800	900	1000	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL - "B" M² STD. 840.72	CONC. & BRICK PIPE PLUG, M² STD. 840.71	PIPE REMOVAL (METERS)	REMARKS
-L-																																					
92+20	1											1			1																						
92+20																																					
92+80	1											1		1																							
92+80																																					
93+05	1											1		1																							
93+05																																					
93+05	1	0.15										1			1																						
93+05																																					
93+00	1	1.50	1.18															1			1																
93+00																																					
93+00																																					
93+00																																					
94+72	1	1.50	0.11								1			1																							
94+72																																					
95+65	1	1.50	0.33								1			1																							
95+65																																					
97+75	1											1		1																							
97+75																																					
97+75	1	1.20									1			1																							
97+75																																					
99+00	1										1			1																							
99+00																																					
99+00	1											1		1																							
99+00																																					
1+82, -Y-RPC	1											1		1																							
1+82, -Y-RPC																																					
-L-																																					
100+30	1											1		1																							
100+30																																					
100+30	1	0.26									1			1																							
100+30																																					
100+30	1											1		1																							
100+30																																					
101+40	1											1		1																							
101+40																																					
101+60	1	0.18									1			1																							
101+60																																					
101+60	1											1		1																							
101+60																																					
19+20, -Y-REV	1															1				1																	
19+20, -Y-REV																								3												2 VERT. ELBOWS & 1 HORIZ. ELBOW
102+20, -L-	1											1		1																							
102+20, -L-																																					
SYSTEM CONTINUES ON NEXT SHEET																																					
SHEET TOTALS	20	6.29	1.62								6	12	2	16		1	1	1		1				3													**SHEET TOTALS**
		8.40																																			

ABBREVIATIONS	
C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

RA-0239

COMPUTED BY: Chris Powell DATE: 3/8/2010

CHECKED BY: Trent Huffman DATE: 3/14/2010

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
X-0002CA	3-B

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 1200mm & UNDER)

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) SIZE 300	375	450	600	750	900	900	1050	1050	1200
THICKNESS OR GAUGE														CLASS V		CLASS IV	
SYSTEM CONTINUED FROM PREVIOUS SHEET																	
-L-																	
102+20	CL	45		68.00	65.35												
102+20	CL	45	46		65.35	65.05											
103+20	CL	46		67.21	64.90												
103+20	CL	46	47		64.90	64.66											
104+00	CL	47		66.94	64.66												
104+00	CL	47	OUT		64.66	62.00							39.6				
104+80	CL	48		67.21	65.56												
104+80	CL	48	47		65.56	64.81											
Structure Numbers 49-157 Shall Be Considered Future																	
2+95, -Y-RPA																	
1+60, -Y-LPB	RT	158		66.22	63.92												
1+60, -Y-LPB	RT	158	171		63.92	63.37											
2+60, -Y- RPB	LT	159		66.33	65.42												
2+60, -Y- RPB	LT	159	160		65.42	65.33				25.2							
2+60, -Y- RPB	RT	160		67.30	65.33												
2+60, -Y- RPB	RT	160	161		65.33	64.89											
3+55, -Y-RPB	RT	161		66.34	64.74												
3+55, -Y-RPB	RT	161	162		64.74	64.18											
1+80, -Y-LPB	LT	162		65.78	64.03												
1+80, -Y-LPB	LT	162	163		64.03	63.98							13.2				
1+80, -Y-LPB	RT	163		66.13	63.98												
1+80, -Y-LPB	RT	163	158		63.98	63.92											
2+30, -Y-LBP	RT	164		66.75	65.45												
2+30, -Y-LPB	RT	164	163		65.45	64.13											
2+30, -Y-LPB	RT	165			69.25												
2+30, -Y-LPB	RT	165	164		69.25	66.76											
2+84, -Y-LPB	RT	166		68.10	66.33												
2+84, -Y-LPB	RT	166	164		66.33	65.45											
2+84, -Y-LPB	LT	167		67.61	66.39												
2+84, -Y-LPB	LT	167	166		66.39	66.33						15.6					
5+00, -Y-RPB	LT	168		68.50	67.05												
5+00, -Y-RPB	LT	168	167		67.05	66.54				27.6							
4+48, -Y-LPB	RT	171		68.00	63.37												
4+48, -Y-LPB	RT	171	220		63.37	63.09							92.4				
15+50, -Y-REV	RT	216		66.70	62.67												
15+50, -Y-REV	RT	216			65.00	64.90											
15+50, -Y-REV	RT	216	OUT		62.67	62.50									54.0		
16+12, -Y-REV	RT	217		68.16	62.85												
16+12, -Y-REV	RT	217	216		62.85	62.67											
16+12, -Y-REV	RT	218		68.65	67.48												
16+12, -Y-REV	RT	218	217		67.48	65.82											
16+15, -Y-REV	RT	219		68.65	67.66												
16+15, -Y-REV	RT	219	218		67.66	67.63											
SYSTEM CONTINUES ON NEXT SHEET																	
SHEET TOTALS										25.2	27.6	15.6	145.2		54.0		

STATION	C.S. PIPE (UNLESS NOTED OTHERWISE) SIZE 300	400	450	600	800	900	1000	1200	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D SIZE 300	375	450	600	750	900	1050	1200
THICKNESS OR GAUGE		1.63	1.63	1.63	2.01	2.01	2.01	2.01								
SYSTEM CONTINUED FROM PREVIOUS SHEET																
-L-																
102+20																
102+20													99.6			
103+20																
103+20														79.2		
104+00																
104+00																
104+80																
104+80													79.2			
Structure Numbers 49-157 Shall Be Considered Future																
2+95, -Y-RPA																
1+60, -Y-LPB																
1+60, -Y-LPB														181.2		
2+60, -Y- RPB																
2+60, -Y- RPB																
2+60, -Y- RPB																
2+60, -Y- RPB												96.0				
3+55, -Y-RPB																
3+55, -Y-RPB													57.6			
1+80, -Y-LPB																
1+80, -Y-LPB																
1+80, -Y-LPB																
1+80, -Y-LPB														18.0		
2+30, -Y-LBP																
2+30, -Y-LPB													45.6			
2+30, -Y-LPB																
2+30, -Y-LPB												10.8				
2+84, -Y-LPB																
2+84, -Y-LPB													49.2			
2+84, -Y-LPB																
2+84, -Y-LPB																
5+00, -Y-RPB												21.6				
5+00, -Y-RPB																
4+48, -Y-LPB																
4+48, -Y-LPB																
15+50, -Y-REV																
15+50, -Y-REV												3.6				
15+50, -Y-REV																
16+12, -Y-REV																
16+12, -Y-REV															60.0	
16+12, -Y-REV																
16+12, -Y-REV													12.0			
16+15, -Y-REV																
16+15, -Y-REV										3.6						
SYSTEM CONTINUES ON NEXT SHEET																
SHEET TOTALS										3.6		121.2	331.2	278.4	60.0	

STATION	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. METERS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	METERS 1.5 THRU 3.00	METERS 3.00 AND ABOVE	*TOTAL METERS FOR PAY QUANTITY SHALL BE COL. 'A' + (1.5 X COL.'B')	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	G.D.I. TYPE 'A' STD. 840.17 OR 840.26	G.D.I. TYPE 'B' STD. 840.18 OR STD. 840.27	G.D.I. FRAME WITH ONE GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.20	G.D.I. FRAME WITH TWO GRATES STD. 840.22		G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29		J.B. STD. 840.31 OR 840.32	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35		M.H. FRAME AND COVER STD. 840.54		PAVED DITCH m2 STD. 850.10	OPEN THROAT C.B. STD. 840.04 OR 840.05			C.S. ELBOWS NO. & SIZE 400	450	600	800	900	1000	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" M² STD. 840.72	CONC. & BRICK PIPE PLUG, M² STD. 840.71	PIPE REMOVAL (METERS)	REMARKS
SYSTEM CONTINUED FROM PREVIOUS SHEET																																																				
-L-																																																				
102+20						1	1.15																		1			1																							
102+20																																																				
103+20						1	0.81										1			1																															
103+20																																																				
104+00						1	0.78										1			1																															
104+00																																																				
104+80						1	0.15										1			1																															
104+80																																																				
Structure Numbers 49-157 Shall Be Considered Future																																																				
2+95, -Y-RPA																																																		18		
1+60, -Y-LPB						1	0.80		1		1																																								
1+60, -Y-LPB																																																				
2+60, -Y- RPB						1												1		1																															
2+60, -Y- RPB																																																				
2+60, -Y- RPB						1	0.47										1			1																															
2+60, -Y- RPB																																																				
3+55, -Y-RPB						1	0.10										1		1	1																															3GI
3+55, -Y-RPB																																																				
1+80, -Y-LPB						1	0.25										1			1																															
1+80, -Y-LPB																																																				
1+80, -Y-LPB						1	0.65		1	1																																									
1+80, -Y-LPB																																																				
2+30, -Y-LBP						1			1			1																																								
2+30, -Y-LPB																																																				
2+30, -Y-LPB																																						10														BERM DITCH OUTLET
2+30, -Y-LPB																																					1															
2+84, -Y-LPB						1	0.27		1			1																																								
2+84, -Y-LPB																																																				
2+84, -Y-LPB						1												1		1																															
2+84, -Y-LPB																																																				
5+00, -Y-RPB						1											1			1																															PIPE INLET EL = 68.100
5+00, -Y-RPB																																																				
4+48, -Y-LPB						1	1.50	1.63									1			1																															
4+48, -Y-LPB																																																				
15+50, -Y-REV						1	1.50	1.03																	1			1																							
15+50, -Y-REV																																																				
15+50, -Y-REV																																																		26.4		
16+12, -Y-REV						1	1.50	2.31																	1			1																							DO NOT DISTURB WELL
16+12, -Y-REV																																																				
16+12, -Y-REV						1			1			1																																							TRANSITION VALLEY GUTTER TO CB
16+12, -Y-REV																																											2									
16+15, -Y-REV						1			1		1																																								TRANSITION VALLEY GUTTER TO CB
16+15, -Y-REV																																																				
SYSTEM CONTINUES ON NEXT SHEET																																																				
SHEET TOTALS						19	9.93	4.97	6	1	2	3					8	2	1		10				3				3		10					1	2								44.4		**SHEET TOTALS**
							16.39																																												

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

RA-0239,6/16/2010,R:\Drainage\x0002ca_Drainage_summaries.xls

RA-0239

COMPUTED BY: Chris Powell DATE: 3/8/2010

CHECKED BY: Trent Huffman DATE: 3/14/2010

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
X-0002CA	3-C

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 1200mm & UNDER)

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 300	375	450	600	750	900	900 CLASS V	1050	1050 CLASS IV	1200	C.S. PIPE (UNLESS NOTED OTHERWISE) 300 (1.63)	400 (1.63)	450 (1.63)	600 (1.63)	800 (2.01)	900 (2.01)	1000 (2.01)	1200 (2.01)
SYSTEM CONTINUED FROM PREVIOUS SHEET																									
16+40, -Y-REV	RT	220		69.28	63.09																				
16+40, -Y-REV	RT	220	217		63.09	63.00																			
3+55, -Y-RPB	LT	IN	161		65.37	64.89					28.8														
3+62, -Y-LPB	LT	169		69.40	68.56																				
3+62, -Y-LPB	LT	169	170		68.56	68.50			15.6																
3+62, -Y-LPB	RT	170		70.18	68.42																				
3+62, -Y-LPB	RT	170	OUT		68.42	68.35																			
4+23, -Y-RPC	CL	172			69.00	68.87					44.4														
2+54, -Y-RPD	RT	180		64.20	58.18																				
2+54, -Y-RPD	RT	180	OUT		58.18	57.90										55.2									
2+64, -Y-RPD	RT	181			61.00																				
2+64, -Y-RPD	RT	181	180		61.00	60.75																			
2+75, -Y-RPD	LT	182		65.10	64.26																				
2+75, -Y-RPD	LT	182	OUT		64.26	61.70			32.4																
		IN	183		67.77	65.07																			
0+84, -Y-LPD	RT	183		66.06	65.07																				
0+84, -Y-LPD	RT	183	184		65.07	64.62																			
1+41, -Y-LPD	RT	184		65.74	64.32																				
1+41, -Y-LPD	RT	184	OUT		64.32	62.00						26.4													
1+56, -Y-LPD	RT	185		65.67	64.37																				
1+56, -Y-LPD	RT	185	184		64.37	64.32						14.4													
2+00, -Y-LPD	RT	186		65.95	64.65																				
2+00, -Y-LPD	RT	186	185		64.65	64.37																			
2+43, -Y-LPD	RT	187		67.75	66.61																				
2+43, -Y-LPD	RT	187			67.00	66.61																			
2+43, -Y-LPD	RT	187	186		66.61	64.81																			
2+43, -Y-LPD	LT	188		68.25	67.34																				
2+43, -Y-LPD	LT	188	187		67.34	66.84			10.8																
3+15, -Y-LPD	RT	189		70.61	69.70																				
3+15, -Y-LPD	RT	189	OUT		69.70	68.20													12.0						
3+15, -Y-LPD	LT	190		71.16	70.25																				
3+15, -Y-LPD	LT	190	189		70.25	69.70			10.8																
Structure Numbers 191-204A Shall Be Considered Future																									
7+77, -Y11-	CL	205			75.66	75.53				19.2															
10+13, -Y14-	CL	206			75.18	74.95				22.8															
SHEET TOTALS									69.6	42.0	73.2	40.8				55.2			12.0						

STATION	STR. FROM	STR. TO	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D 300	375	450	600	750	900	1050	1200	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. METERS R.C.P.	C.S.P.	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	*TOTAL METERS FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') METERS A 1.5 THRU 3.00	B 3.00 AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G
SYSTEM CONTINUED FROM PREVIOUS SHEET																						
16+40, -Y-REV	220															1	1.50	3.19				
16+40, -Y-REV	220	217						26.4														
3+55, -Y-RPB	IN	161																				
3+62, -Y-LPB	169															1						
3+62, -Y-LPB	169	170																				
3+62, -Y-LPB	170															1	0.26		1			1
3+62, -Y-LPB	170	OUT			12.0																	
4+23, -Y-RPC	172																					
2+54, -Y-RPD	180															1	1.50	3.02				
2+54, -Y-RPD	180	OUT																				
2+64, -Y-RPD	181													1.0								
2+64, -Y-RPD	181	180			12.0																	
2+75, -Y-RPD	182															1						
2+75, -Y-RPD	182	OUT																				
	IN	183			34.8																	
0+84, -Y-LPD	183															1			1		1	
0+84, -Y-LPD	183	184			51.6																	
1+41, -Y-LPD	184															1			1		1	
1+41, -Y-LPD	184	OUT																				
1+56, -Y-LPD	185															1			1	1		
1+56, -Y-LPD	185	184																				
2+00, -Y-LPD	186															1			1			1
2+00, -Y-LPD	186	185					39.6															
2+43, -Y-LPD	187															1			1			1
2+43, -Y-LPD	187					6.0																
2+43, -Y-LPD	187	186				43.2																
2+43, -Y-LPD	188															1			1			1
2+43, -Y-LPD	188	187																				
3+15, -Y-LPD	189															1			1			1
3+15, -Y-LPD	189	OUT																				
3+15, -Y-LPD	190															1			1			1
3+15, -Y-LPD	190	189																				
Structure Numbers 191-204A Shall Be Considered Future																						
7+77, -Y11-	205																					
10+13, -Y14-	206																					
SHEET TOTALS					110.4	49.2	39.6	26.4						1.0		13	3.26	6.21	9	1	2	6
																	11.33					

STATION	STR. FROM	STR. TO	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. FRAME WITH ONE GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.20	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	M.H. FRAME AND COVER STD. 840.54	PAVED DITCH m2 STD. 850.10	OPEN THROAT C.B. STD. 840.04 OR 840.05	C.S. ELBOWS NO. & SIZE 400	450	600	800	900	1000	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" M^3 STD. 840.72	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	PIPE REMOVAL (METERS)	REMARKS
SYSTEM CONTINUED FROM PREVIOUS SHEET																												
16+40, -Y-REV	220											1			1													DO NOT DISTURB WELL
16+40, -Y-REV	220	217																										
3+55, -Y-RPB	IN	161																										
3+62, -Y-LPB	169					1			1																			
3+62, -Y-LPB	169	170																										
3+62, -Y-LPB	170																											
3+62, -Y-LPB	170	OUT																										
4+23, -Y-RPC	172																											
2+54, -Y-RPD	180																1											
2+54, -Y-RPD	180	OUT																										
2+64, -Y-RPD	181																											
2+64, -Y-RPD	181	180																									82.8	
2+75, -Y-RPD	182					1		1																				
2+75, -Y-RPD	182	OUT																										
	IN	183																										
0+84, -Y-LPD	183																											
0+84, -Y-LPD	183	184																										
1+41, -Y-LPD	184																											
1+41, -Y-LPD	184	OUT																									32.4	
1+56, -Y-LPD	185																											
1+56, -Y-LPD	185	184																										
2+00, -Y-LPD	186																											
2+00, -Y-LPD	186	185																										
2+43, -Y-LPD	187																											
2+43, -Y-LPD	187																											
2+43, -Y-LPD	187	186																										
2+43, -Y-LPD	188																											
2+43, -Y-LPD	188	187																										
3+15, -Y-LPD	189																											ROD AND LUG CONN. W/ SLEEVE GASKET
3+15, -Y-LPD	189	OUT																										
3+15, -Y-LPD	190																											
3+15, -Y-LPD	190	189																										
Structure Numbers 191-204A Shall Be Considered Future																												
7+77, -Y11-	205																										15.6	
10+13, -Y14-	206																										14.4	
SHEET TOTALS						2		1	1			1			1		1										145.2	SHEET TOTALS

ABBREVIATIONS

- C.B. CATCH BASIN
- N.D.I. NARROW DROP INLET
- D.I. DROP INLET
- G.D.I. GRATED DROP INLET
- G.D.I.(N.S.) GRATED DROP INLET (NARROW SLOT)
- J.B. JUNCTION BOX
- M.H. MANHOLE
- T.B.D.I. TRAFFIC BEARING DROP INLET
- T.B.J.B. TRAFFIC BEARING JUNCTION BOX

COMPUTED BY: Chris Powell DATE: 3/8/2010

CHECKED BY: Trent Huffman DATE: 3/14/2010

RA-0239

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
X-0002CA	3-D

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 1200mm & UNDER)

STATION	LOCATION (LT, RT, OR CL)'	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 300	375	450	600	750	900	900 CLASS V	1050	1050 CLASS IV	1200	C.S. PIPE (UNLESS NOTED OTHERWISE) 300 (1.63)	400 (1.63)	450 (1.63)	600 (1.63)	800 (2.01)	900 (2.01)	1000 (2.01)	1200 (2.01)
12+70, -Y- REV	LT	207		70.82	69.37																				
12+70, -Y- REV	LT	207	210		69.37	65.43																			
12+70, -Y- REV	RT	208		71.84	70.45																				
12+70, -Y- REV	RT	208	207		70.45	69.52				15.6															
12+70, -Y- REV	RT	209		71.41	70.50																				
12+70, -Y- REV	RT	209	208		70.50	70.45				14.4															
13+60, -Y- REV	LT	210		66.88	65.43																				
13+60, -Y- REV	LT	210	OUT		65.43	64.90																			
13+60, -Y- REV	RT	211		67.88	66.97																				
13+60, -Y- REV	RT	211	210		66.97	65.66			15.6																
14+50, -Y- REV	RT	213		66.24	65.23																				
14+50, -Y- REV	RT	213	OUT		65.23	63.60			21.6																
14+60, -Y- REV	RT	214		66.19	65.26																				
14+60, -Y- REV	RT	214	213		65.26	65.23			9.6																
14+71, -Y- REV	RT	215		66.20	65.29																				
14+71, -Y- REV	RT	215	214		65.29	65.26			9.6																
17+65, -Y- REV	LT	221		75.41	74.44																				
17+65, -Y- REV	LT	221	222		74.44	74.39			14.4																
17+65, -Y- REV	RT	222		75.60	74.39																				
17+65, -Y- REV	RT	222	223		74.39	74.36			8.4																
17+65, -Y- REV	RT	223		75.41	74.36																				
17+65, -Y- REV	RT	223	OUT		74.36	69.90													26.4						
20+75, -Y- REV	LT	223A		72.34	71.43																				
20+75, -Y- REV	LT	223A	OUT		71.43	69.45			24.0																
21+67, -Y- REV	RT	224	OUT	70.09	69.18	68.56			20.4																
13+88, -Y1-	CL	225	OUT		65.56	66.26											44.4								
14+46, -Y1-	LT	226			69.18	69.42																			
14+84, -Y1-	LT	227			72.20	70.70																			
10+37, -Y4-	CL	229		67.96	65.86																				
10+37, -Y4-		229	230		65.86	64.62			32.4																
10+72, -Y4-	CL	230		68.03	64.62																				
12+85, -Y1-	RT	244																							
12+20, -Y1-	RT	245		70.22	69.31																				
12+20, -Y1-	RT	245	OUT		69.31	69.29			4.8																
SHEET TOTALS									160.8	30.0							44.4		26.4						

STATION	FROM	TO	CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D 300	375	450	600	750	900	1050	1200	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. METERS R.C.P.	C.S.P.	QUANITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	*TOTAL METERS FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL.'B') METERS A 1.5 THRU 3.00	B 3.00 AND ABOVE	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN
12+70, -Y- REV	207															1								
12+70, -Y- REV	207	210				86.4																		
12+70, -Y- REV	208															1			1			1		1
12+70, -Y- REV	208	207																						
12+70, -Y- REV	209															1								
12+70, -Y- REV	209	208																						
13+60, -Y- REV	210															1								
13+60, -Y- REV	210	OUT				18.0																		
13+60, -Y- REV	211															1			1			1		1
13+60, -Y- REV	211	210																						
14+50, -Y- REV	213															1			1			1		1
14+50, -Y- REV	213	OUT																						
14+60, -Y- REV	214															1			1	1				1
14+60, -Y- REV	214	213																						
14+71, -Y- REV	215															1			1		1			1
14+71, -Y- REV	215	214																						
17+65, -Y- REV	221															1								
17+65, -Y- REV	221	222																						
17+65, -Y- REV	222															1							1	
17+65, -Y- REV	222	223																						
17+65, -Y- REV	223															1								
17+65, -Y- REV	223	OUT																						
20+75, -Y- REV	223A															1			1		1			1
20+75, -Y- REV	223A	OUT																						
21+67, -Y- REV	224	OUT														1			1		1			1
13+88, -Y1-	225	OUT												4.6										
14+46, -Y1-	226											7.2												
14+84, -Y1-	227											19.2												
10+37, -Y4-	229															1	0.60							
10+37, -Y4-	229	230																						
10+72, -Y4-	230															1	1.50	0.41						
12+85, -Y1-	244											6.0												
12+20, -Y1-	245															1			1		1			
12+20, -Y1-	245	OUT																						
SHEET TOTALS						104.4						32.4		4.6		16.0	2.10	0.41	8	1	4	3	1	7
																	2.63							

STATION	FROM	TO	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. FRAME WITH ONE GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.20	G.D.I. FRAME WITH TWO GRATES STD. 840.22	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29	J.B. STD. 840.31 OR 840.32	T.B.J.B. STD. 840.34	T.B.D.I. STD. 840.35	M.H. FRAME AND COVER STD. 840.54	PAVED DITCH m2 STD. 850.10	OPEN THROAT C.B. STD. 840.04 OR 840.05	C.S. ELBOWS NO. & SIZE 400	450	600	800	900	1000	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" M^3 STD. 840.72	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	PIPE REMOVAL (METERS)	REMARKS
12+70, -Y- REV	207			1				1																		
12+70, -Y- REV	207	210																								
12+70, -Y- REV	208																									
12+70, -Y- REV	208	207																							19.2	
12+70, -Y- REV	209			1				1																		
12+70, -Y- REV	209	208																								
13+60, -Y- REV	210		1					1																		
13+60, -Y- REV	210	OUT																								
13+60, -Y- REV	211																									
13+60, -Y- REV	211	210																							8.4	STRUCTURE NUMBER 212 NOT USED
14+50, -Y- REV	213																									
14+50, -Y- REV	213	OUT																							24	
14+60, -Y- REV	214																									
14+60, -Y- REV	214	213																							13.2	INACTIVE CMP
14+71, -Y- REV	215																									
14+71, -Y- REV	215	214																								
17+65, -Y- REV	221								1			1														
17+65, -Y- REV	221	222																								
17+65, -Y- REV	222								1			1														SEE STD. 852.06 FOR PLACEMENT METHOD
17+65, -Y- REV	222	223																								
17+65, -Y- REV	223								1			1														
17+65, -Y- REV	223	OUT														2										ROD AND LUG CONN. W/ SLEEVE GASKET
20+75, -Y- REV	223A																									
20+75, -Y- REV	223A	OUT																								
21+67, -Y- REV	224	OUT																								
13+88, -Y1-	225	OUT																								
14+46, -Y1-	226																									
14+84, -Y1-	227																									
10+37, -Y4-	229										1		1													
10+37, -Y4-	229	230																								
10+72, -Y4-	230										1		1													
12+85, -Y1-	244																									
12+20, -Y1-	245																									TRANSITION VALLEY GUTTER TO CB
12+20, -Y1-	245	OUT																								
SHEET TOTALS			1	2				3	3		2	3	2			2									64.8	SHEET TOTALS

SIZE / THICKNESS OR GAUGE

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

RA-0239

COMPUTED BY: Chris Powell DATE: 3/8/2010

CHECKED BY: Trent Huffman DATE: 3/14/2010

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
X-0002CA	3-E

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 1200mm & UNDER)

STATION	LOCATION (LT, RT, OR CL)[1]	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) SIZE										C.S. PIPE (UNLESS NOTED OTHERWISE) SIZE										CLASS III R.C. PIPE OR ALUMINIZED C.S. PIPE, TYPE IR OR HDPE PIPE, TYPE S OR D SIZE							
								300	375	450	600	750	900	900	1050	1050	1200	300	400	450	600	800	900	1000	1200	1200		300	375	450	600	750	900	1050	1200
														CLASS V		CLASS IV		1.63	1.63	1.63	1.63	2.01	2.01	2.01	2.01									
TOTAL SHEET 3									142.8	70.8	27.6	22.8							13.2	39.6									150.0	38.4	128.4	278.4	22.8		
TOTAL SHEET 3-A									223.2		52.8	32.4	31.2		70.8				44.4										105.6		310.8	300.0		3.6	
TOTAL SHEET 3-B										25.2	27.6	15.6	145.2		54.0					10.8	12.0									3.6	121.2	331.2	278.4	60.0	
TOTAL SHEET 3-C									69.6	42.0	73.2	40.8				55.2			12.0											110.4	49.2	39.6	26.4		
TOTAL SHEET 3-D									160.8	30.0							44.4		26.4												104.4				
X-0002CA TOTALS									596.4	168.0	181.2	111.6	176.4		124.8	55.2	44.4		96.0	50.4	12.0								255.6	152.4	714.0	949.2	327.6	63.6	
X-0002BC TOTALS									378.0	223.0	163.2			127.8						58.8									137.4	295.2	213.6				
COMBINED TOTALS									974.4	391.0	344.4	111.6	176.4	127.8	124.8	55.2	44.4		96.0	109.2	12.0								393.0	447.6	927.6	949.2	327.6	63.6	

STATION	375mm SIDE DRAIN PIPE	450mm SIDE DRAIN PIPE	600mm SIDE DRAIN PIPE	ENDWALLS STD. 838.01 OR STD. 838.11 (UNLESS NOTED OTHERWISE) CU. METERS R.C.P.	C.S.P.	QUANTITIES FOR DRAINAGE STRUCTURES PER EACH (0 THRU 1.50)	METERS A 1.5 THRU 3.00	METERS B 3.00 AND ABOVE	"TOTAL METERS FOR PAY QUANTITY SHALL BE COL. 'A' + (1.3 X COL. 'B')	C.B. STD. 840.01 OR STD. 840.02	FRAME, GRATES, AND HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	G.D.I. TYPE "A" STD. 840.17 OR 840.26	G.D.I. TYPE "B" STD. 840.18 OR STD. 840.27	G.D.I. FRAME WITH ONE GRATE STD. 840.22	G.D.I. FRAME WITH TWO GRATES STD. 840.20	G.D.I. FRAME WITH TWO GRATES STD. 840.22		G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.24	G.D.I. (N.S.) FRAME WITH TWO GRATES STD. 840.29		J.B. STD. 840.31 OR 840.32	T.B.J.B. STD 840.34	T.B.D.I. STD. 840.35		M.H. FRAME AND COVER STD. 840.54		PAVED DITCH m2 STD. 850.10	OPEN THROAT C.B. STD. 840.04 OR 840.05		C.S. ELBOWS NO. & SIZE 400	450	600	800	900	1000	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" M^3 STD. 840.72	CONC. & BRICK PIPE PLUG, M^3 STD. 840.71	PIPE REMOVAL (METERS)	REMARKS
TOTAL SHEET 3						19	2.43									5	14		1	18											20			2	2										TOTAL SHEET 3
TOTAL SHEET 3-A				3.4		20	6.29	1.62								6	12		2	16		1		1		1								3											TOTAL SHEET 3-A
TOTAL SHEET 3-B						19	9.93	4.97	6	1	2	3				8	2	1		10						3					3		10			1	2							44.4	TOTAL SHEET 3-B
TOTAL SHEET 3-C				1.0		13	3.26	6.21	9	1	2	6					2		1	1						1					1			1										145.2	TOTAL SHEET 3-C
TOTAL SHEET 3-D			32.4	4.6		16	2.10	0.41	8	1	4	3	1	7	1	2						3	3		2	3		2							2									64.8	TOTAL SHEET 3-D
																																													19.2	PAVEMENT REMOVAL TOTAL FROM 3-F
X-0002CA TOTALS			32.4	9.0		87	24.01	13.21	23	3	8	12	1	7	20	32	1	4	45			3	4		5	2	4		7		30	1		7	3	2							273.6	X-0002CA TOTALS
							41.18																																							
X-0002BC TOTALS	121.2			2.6		35	7.20	1.20	1			1			4	29		12	21							1			1						4							0.05	20.4	X-0002BC TOTALS
							8.76																																							
COMBINED TOTALS	121.2	32.4		11.6		122	31.21	14.41	24	3	8	13	1	7	24	61	1	16	66			3	4		5	3	4		8		30	1		7	7	2							0.05	294.0	COMBINED TOTALS
							49.94																																							

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

RA-0239

COMPUTED BY: Chris Powell	DATE: 3/8/2010
CHECKED BY: Trent Huffman	DATE: 3/14/2010

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

METRIC

PROJECT NO.	SHEET NO.
X-0002CA	3-F

LIST OF PIPES, ENDWALLS, ETC. (FOR PIPES 1350mm & OVER)

STATION / SIZE / THICKNESS OR GAUGE	LOCATION (LT, RT, OR CL)	STRUCTURE NO. FROM	STRUCTURE NO. TO	TOP ELEVATION	INVERT ELEVATION	INVERT ELEVATION	SLOPE CRITICAL	CLASS III R.C. PIPE (UNLESS NOTED OTHERWISE) 1350	1500 CLASS IV	1650	1800	1950	2100	1350 CLASS IV	C.S. PIPE (UNLESS NOTED OTHERWISE) 1400 2.77	1400 3.51	1400 4.27	1500 2.77	1500 3.51	1650	1800	SHOP ELONGATED	STRUCTURAL PLATE PIPE 1500 2.77	1500 3.51	1500 4.27	1650 2.77	1650 3.51	1650 4.27	1800 2.77	1800 3.51	1800 4.27	REINFORCED ENDWALLS CLASS 'A' CONC. WITH R.C. - M³	WITH C.S. - M³	MASONRY DRAINAGE STRUCTURES CUBIC METERS	C.B. STD. 840.01 OR 840.02	FRAMES, GRATES & HOOD STANDARD 840.03 TYPE OF GRATE E	F	G	CONCRETE TRANSITIONAL SECTION DROP INLET	CATCH BASIN	CORR. STEEL ELBOWS NO. & SIZE	CONC. COLLARS CL. "B" M³ STD. 840.72	PIPE REMOVAL (METERS)	REMARKS
-L-																																													
84+75	LT	3	OUT		52.15	51.86					100.8																				7.2													19.2	TOTAL FOR PAVEMENT REMOVAL
																																													SHOWN ON SHEET 3-E
Structure Numbers 106, 107 & 122 Shall Be Considered Future																																													
X-0002CA TOTALS											100.8																				7.2													19.2	X-0002CA TOTALS
X-0002BC TOTALS																																													X-0002BC TOTALS
																																													(There are no 1350mm & OVER items on
																																													on X-0002BC)
COMBINED TOTALS											100.8																				7.2													19.2	COMBINED TOTALS

ABBREVIATIONS

C.B.	CATCH BASIN
N.D.I.	NARROW DROP INLET
D.I.	DROP INLET
G.D.I.	GRATED DROP INLET
G.D.I.(N.S.)	GRATED DROP INLET (NARROW SLOT)
J.B.	JUNCTION BOX
M.H.	MANHOLE
T.B.D.I.	TRAFFIC BEARING DROP INLET
T.B.J.B.	TRAFFIC BEARING JUNCTION BOX

RA-0239

COMPUTED BY: C. POWELL DATE: 3/2/2010
CHECKED BY: T. HUFFMAN DATE: 6/2/2010

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
GUARDRAIL SUMMARY

METRIC

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	3-G

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL
W = TOTAL WIDTH OF FLARE FROM BEGIN

G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GRAU-350	M-350	CAT-1	AT-1	TYPE-III	B-77	B-83	TES	G	NG				
-Y-REV	13+35	14+18	RT	83.82			14+08	14+12	2.4	3.4					1		1											FILL WARRANT / CULVERT
-Y-REV	13+97	15+02	LT	106.68				14+15	2.4	3.4							1											TIE TO -Y-REV / FILL WARRANT / CULVERT
-Y-REV	17+36	18+07	RT	72.39				18+07	2.4	3.4					1					1								BRIDGE
-Y-REV	17+37	17+75	LT	38.10			17+75		2.4	3.4							1			1								BRIDGE
-Y-REV	19+03	19+23	RT	19.05			19+02		2.4	3.4							1			1								BRIDGE
-Y-REV	18+72	19+45	LT	72.39				18+72	2.4	3.4					1					1								BRIDGE
-Y-REV	21+61	21+73	LT	11.43																		2						ROAD CLOSURE (2 TERMINAL END SECTIONS)
-Y-RPA	3+30	3+60	RT		30.00																							
-Y-RPA	3+60	4+00	RT	41.91			1+20		4.2	5.2																		TIE TO -Y-REV / FILL WARRANT / CULVERT
-Y-RPD	2+32		LT	11.43																		2						ROAD CLOSURE (2 TERMINAL END SECTIONS)
-Y1-	13+25	14+23	RT	99.06			13+80	13+80	2.4	3.4					2													FILL WARRANT
-Y1-	13+57	14+43	LT	87.63			13+60	13+60	2.4	3.4					2													FILL WARRANT
-Y3-	10+35	-	CL	7.62																		2						ROAD CLOSURE (2 TERMINAL END SECTIONS)
X-0002CA TOTAL				651.51	30.00										7		4			4		6						X-0002CA TOTAL
	LESS ANCHOR DEDUCTIONS																											
		GRAU-350	7 @ 15.24	-106.68																								
		CAT-1	4 @ 1.91	-7.64																								
		B-77	4 @ 5.72	-22.88																								
		TES	6																									
X-0002CA SUB-TOTAL				514.31	30.00										7		4			4		6						X-0002CA SUB-TOTAL
X-0002CA SAY TOTAL				525.78	30.00										7		4			4		6						X-0002CA SAY TOTAL
ADDITIONAL GUARDRAIL POSTS (X-0002CA)			15																									
X-0002BC SAY TOTAL				0											1					1								X-0002BC SAY TOTALS
ADDITIONAL GUARDRAIL POSTS (X-0002BC)			5																									
X-0002BC SAY TOTAL				0											1					1								X-0002BC SAY TOTALS
X-0002CA SAY TOTAL				525.78	30.00										7		4			4		6						X-0002CA SAY TOTAL
COMBINED TOTALS				525.78	30.00										8		4			5		6						**COMBINED TOTALS**
ADDITIONAL GUARDRAIL POSTS X-0002BC / X-0002CA			20																									
TEMPORARY GUARDRAIL (SEE TRAFFIC CONTROL PLANS)																												
-Y-REV	13+81	14+85	LT	102.87											2													TEMPORARY GUARDRAIL
	LESS ANCHOR DEDUCTIONS																											
		GRAU-350	2 @ 15.24	-30.48																								
TEMPORARY GUARDRAIL TOTAL				72.39											2													TEMPORARY GUARDRAIL TOTAL

RA-0239

COMPUTED BY:	C. POWELL	DATE:	3/2/2010
CHECKED BY:	T. HUFFMAN	DATE:	3/3/2010

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

METRIC

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	3-H

FUTURE GUARDRAIL SUMMARY

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL
W = TOTAL WIDTH OF FLARE FROM BEGIN

G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOUL WIDTH	FLARE LENGTH		W		ANCHORS								IMPACT ATTENUATOR TYPE 350		SINGLE FACED CONCRETE BARRIER	REMOVE EXISTING GUARDRAIL	REMOVE & STOCKPILE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	GRAU-350	M-350	CAT-1	AT-1	TYPE-III	B-77	B-83	TES	G	NG				
-L-	83+40	85+00	RT																						160			SINGLE FACED BARRIER ALONG SOUND WALL
-L-	84+37	85+75	LT	137.16			85+60	84+40	4.2	5.2					1		1											FILL WARRANT
-L-	88+70	89+23	RT	53.34			89+20	89+20	4.2	5.2					1		1											OVERHEAD SIGN FOUNDATION
-L-	92+45	93+63	RT	118.11			92+60	93+60	4.2	5.2					1		1											FILL WARRANT
-L-	92+57	94+35	LT	179.07			94+20	92+60	4.2	5.2					1		1											FILL WARRANT
-L-	96+62	97+23	MED RT	60.96			97+20	97+20	4.2	5.2					1		1											OVERHEAD SIGN FOUNDATION
-L-	96+70	97+23	RT	53.34			97+20	97+20	4.2	5.2					1		1											OVERHEAD SIGN FOUNDATION
-L-	97+17	97+78	MED LT	60.96			97+20	97+20	4.2	5.2					1		1											OVERHEAD SIGN FOUNDATION
-L-	101+59	102+12	RT	53.34			102+09	102+09	4.2	5.2					1		1											OVERHEAD SIGN FOUNDATION
-L-	102+12	103+14	MED RT	68.58			102+46	102+80	4.9		20.5	20.5	1.8	1.8						2				1	34			MEDIAN OBSTACLE PROTECTION
-L-	102+12	103+14	MED LT	68.58			102+46	102+80	4.9		20.5	20.5	1.8	1.8						2				1	34			MEDIAN OBSTACLE PROTECTION
-L-	103+18	103+71	LT	53.34			103+21	103+21	4.2	5.2					1		1											OVERHEAD SIGN FOUNDATION
-Y-RPA	2+70	3+30	RT	60.96			1+20		4.2	5.2					1													FILL WARRANT / CULVERT
-Y-RPD	1+50	3+45	LT	194.31			3+20	1+20	4.2	5.2					1													FILL WARRANT
X-0002CA TOTAL				1,162.05											11		9			4				2	228			X-0002CA TOTAL
	LESS ANCHOR DEDUCTIONS																											
		GRAU-350	11 @ 15.24	-167.64																								
		CAT-1	9 @ 1.91	-17.19																								
		B-77	4 @ 5.72	-22.88																								
X-0002CA SUB-TOTAL				954.34											11		9			4				2	228			X-0002CA SUB-TOTAL
X-0002CA SAY TOTAL				971.55											11		9			4				2	228			X-0002CA SAY TOTAL
ADDITIONAL GUARDRAIL POSTS (X-0002CA)			10																									
X-0002BC SAY TOTAL				1379.22											8	5	7			18								X-0002BC SAY TOTAL
ADDITIONAL GUARDRAIL POSTS (X-0002BC)			10																									
X-0002BC SAY TOTAL				1,379.22											8	5	7			18								X-0002BC SAY TOTAL
X-0002CA SAY TOTAL				971.55											11		9			4				2	228			X-0002CA SAY TOTAL
COMBINED TOTAL				**2,350.77**											**19**	**5**	**16**			**22**				**2**	**228**			**COMBINED PROJECT TOTALS**
ADDITIONAL GUARDRAIL POSTS (X-0002BC / X-0002CA)			**20**																									

COMPUTED BY: C. POWELL DATE: 4/2/2010
CHECKED BY: T. HUFFMAN DATE: 4/5/2010

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

METRIC

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	3-1

ASPHALT PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	AREA (m2)
-Y-LPD	1+75	2+88	RT	836
-Y-RPD	2+26	2+77	LT	481
-Y-RPD	3+68	3+90	LT	529
-Y-	18+91	19+58	LT	130
-Y-REV	21+60	21+70	LT & RT	136
-Y1-	10+00	10+08	LT & RT	114
-Y3-	10+16	10+36	LT & RT	136
			TOTAL	2,362
			X-0002BC SAY TOTAL	610
			X-0002CA SAY TOTAL	2,370
			COMBINED TOTAL	2,980

SUMMARY OF BREAKING EXISTING ASPHALT PAVEMENT

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	AREA (m2)
-Y-	13+41	14+52	CL	782
-Y-	14+97	17+48	CL	1,761
-Y-	17+48	21+69	CL	2,364
			TOTAL	4,907
			X-0002BC SAY TOTAL	0
			X-0002CA SAY TOTAL	5,000
			COMBINED TOTAL	5,000

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	LENGTH (m)
-Y-REV	17+63	18+00	RT	37
-Y-REV	17+63	17+68	LT	5
-Y-REV	19+10	19+22	RT	12
			TOTAL	54
			X-0002BC TOTAL	0
			X-0002CA TOTAL	55
			COMBINED TOTAL	55

VALLEY GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	LENGTH (m)
-Y1-	10+08	10+30	LT/RT	* 58
-Y1-	11+62	13+01	RT	139
-Y1-	11+62	12+08	LT	46
-Y1-	12+14	13+01	LT	87
-Y4-	10+14	10+83	RT	69
-Y4-	10+14	10+83	LT	69
			TOTAL	468
			X-0002BC SAY TOTAL	0
			X-0002CA SAY TOTAL	480
			COMBINED TOTAL	480

* CUL-DA-SAC

WOVEN WIRE FENCE SUMMARY

STATION TO STATION	LOCATION LT/RT	FABRIC L.M.	100mm POSTS	125mm POSTS
-L 83+40 to -Y-RPB 6+93	LT	2,008	428	77
-L- 83+40 to -Y-REV 22+49	RT	1,934	415	70
-Y-REV 11+72 to -Y-REV 14+08	RT	499	108	16
-Y-REV 14+14 to -Y-REV 16+60	RT	264	56	11
-Y-REV 11+20 to -Y-REV 14+14	LT	575	123	22
-Y-REV 14+20 to -Y-RPA 3+17	LT	135	24	13
-Y-RPA 2+70 to -Y-RPA- 3+04	RT	30	3	7
-Y-RPD 1+50 to -Y-RPD 2+13	LT	54	7	10
-Y-RPD 2+23 to -Y-REV 22+49	LT	656	129	46
	TOTAL	6,155	1,293	272
	X-0002BC SAY TOTAL	3,070	640	160
	X-0002CA SAY TOTAL	6,160	1,300	280
	COMBINED TOTAL	9,230	1,940	440

COMPUTED BY: C. POWELL DATE: 10/5/2010
CHECKED BY: T. E. HUFFMAN DATE: 10/5/2010

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	3-J

METRIC

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

IN CUBIC METERS

X-0002CA

LOCATION				UNCL. EXCAVATION	UNDERCUT	EMBT+%	BORROW	WASTE
-L-	83+40.000	TO	93+40.000	189,811	0	79,670	0	110,141
-L-	93+40.000	TO	96+80.000	174	0	23,498	23,324	0
125mm EXTRA MAT'L FROM GRADING ONLY						9,140	9,140	
SUBTOTAL SUMMARY No. 1				189,985	0	112,308	32,464	110,141
-L-	96+80.000	TO	105+50.000	56,292	4,416	81,714	53,957	32,951
-Y-RPA	2+70.000	TO	3+40.000	0	0	9,475	9,475	0
-Y-RPB	2+00.000	TO	7+00.000	32,660	0	5,820	0	26,840
-Y-RPC	3+00.000	TO	4+00.000	1	0	1,920	1,919	0
-Y-RPD	1+60.000	TO	6+00.000	7,122	0	61,505	54,383	0
-Y-LPB	1+20.000	TO	2+20.000	10,473	0	0	0	10,473
-Y-LPD	1+00.000	TO	1+80.000	7,338	0	0	0	7,338
-Y-	9+75.000	TO	11+20.000	368	0	24	0	344
			LINE BACK					
-Y-REV	11+20.000	TO	17+86.093	4,188	0	56,884	52,696	0
	LINE AHEAD		BEGIN BRIDGE					
-Y-REV	18+92.093	TO	22+48.815	451	0	54,254	53,803	0
	END BRIDGE		LINE BACK					
-Y-	22+57.111	TO	25+60.000	3,098	0	30	0	3,068
	LINE AHEAD							
-Y1-	11+62.382	TO	15+20.000	681	0	9,173	8,492	0
-Y4-	10+14.327	TO	10+82.584	111	0	2,229	2,118	0
-Y11-	7+71.932	TO	8+20.000	255	0	0	0	255
-Y14-	10+09.785	TO	10+60.000	360	0	4	0	356
125mm EXTRA MAT'L FROM GRADING ONLY						12,305	12,305	
SUBTOTAL SUMMARY No. 2				123,398	4,416	295,337	249,148	81,625
SUBTOTAL SUMMARIES 1 & 2				313,383	4,416	407,645	281,612	191,766
ADDITIONAL UNDERCUT					2,350	2,938	2,938	2,350
SHOULDER MATERIAL						2,988	2,988	
WASTE IN LIEU OF BORROW							-152,415	-152,415
LOSS DUE TO CLEARING AND GRUBBING				-3,000			3,000	
SELECT MAT'L CLASS II OR III IN LIEU OF BORROW						-4,766	-4,766	
PROJECT SUBTOTAL				310,383	6,766	408,805	133,357	41,701
EST 5% TO REPLACE TOP SOIL ON BORROW PIT							6,668	
X-0002CA GRAND TOTALS:				310,383	6,766	408,805	140,025	41,701
X-0002CA SAY TOTALS:				**310,400**	**6,800**		**140,100**	

ESTIMATED DDE	1,600 M3	
PAVEMENT STRUCTURE VOLUME (-Y- & -Y-REV)	4,137 M3	
SHALLOW UNDERCUT (CONTINGENCY)	200 M3	
GRADE POINT UNDERCUT	2,000 M3	
SUBGRADE UNDERCUT (CONTINGENCY)	350 M3	
SELECT GRANULAR MAT'L, CLASS II OR III	4,766 M3	(BACKFILL FOR SUBGRADE UNDERCUT AREAS)
SUBGRADE STAB - STABILIZER AGGREGATE	2,950 MTNS	
CLASS IV SUBGRADE STABILIZATION	450 MTNS	

Earthwork quantities are calculated by the Roadway Design Unit. These earthwork quantities are based in part on subsurface data provided by the Geotechnical Engineering Unit.

Note: "Quantities are approximate only. The Resident Engineer will re-cross-section the work accurately when the project is staked out. These cross-section notes will be used in computing the final quantities for which the contractor will be paid."

R:\Roadway\Proj\0_0\x0002ca_rdy_psh03j.dgn
10/7/2010
thuffman

PROJ. REFERENCE NO.	SHEET NO.
X-0002CA	3-K

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4-10,12,16	USA FORT BRAGG MILITARY RESERVATION
2	9-11	PROGRESS ENERGY
917	10	NCDOT (FORMERLY VONNIE ROSE McLAMB KNIGHT)
907	10,11	NCDOT (FORMERLY LLOYD E. AND ANN B. HEMBRE)
5	10	McCLEAN DEVELOPMENT CORP.
6	10	PAUL THOMPSON DEVELOPMENT, CORP.
7	10	THOMAS R. McCLEAN (TRUSTEE)
8	10-11	PAUL THOMPSON DEVELOPMENT, CORP.
9	10	REGINALD H. AND VIOLET T. BRAXTON
912	10	NCDOT (FORMERLY RAYMOND DOHLSTORM)
11	10	MONTY SPICER
12	10	CHARLES W BLUE II
13	10	REGINALD H. AND VIOLET T. BRAXTON
14		**NOT USED**
15	10	JOSEPH OLIVIA
16	10	JAMES E AND PATRICIA W. PETERSON
17	10	GLORIA McFADDEN NELSON
911	10	NCDOT (FORMERLY RICKY D. AND SHARON T. NANNEY
915	10	NCDOT (FORMERLY PAUL ROLLIZO AND WIFE, HAZEL ROLLIZO)
914	10	NCDOT (FORMERLY ROBERT ACKER)
21	10	GLENN E. AND LOUISE B. WHITE
22	10	NEAL E. MCLEOD, TRUSTEE
23	10	RICHARD V. AND LORETTA MYER
24	10	RUFUS GRIFFIN III AND ZAUDITU-UBE C. GRIFFITH
25	10	KEITH A. PACE
26	10	MICHAEL REID
27	10	JERRY L. HAMILTON
28	10	CHARLES O. AND DELORES J. PLUMMER
921	10	NCDOT (FORMERLY GILBERT FRANCO)
30	10	JEREMY HELLER
31	10	BRUCE TANNER
32	10	CLYDE F. AND CONNIE L. STRICKLAND
33	10	HENRY J. AND CASSANDRA B. MORRISEY
920	10	NCDOT (FORMERLY MICHAEL N. AND DEBRA A. SULLIVAN)
35	10	DORIS E. AND MARTHA E. MOORE
36	10	TAD M. AND ELEANA M. P. CRAIG
37	10	GARY J. AND DEBORAH J. ENGLE
38	10	THOMAS McDUFFIE, JR.
39	10	PHILLIP J. AND REGINA K. STINSON
40	10	BETTY SMITH
41	10	ANTHONY L AND VIVIAN L. BOYLORN
42	10	WILLIAM H. AND CYNTHIA D. HAWKINS
43	10	JAMES TOLBERT
44	10	PAUL THOMPSON DEVELOPMENT, CORP.
45		**NOT USED**
46	11,12	SAVAGE & WADDELL INVESTMENTS, LLC
47	12	SOUTH RIVER ELECTRIC MEMBERSHIP CORP.
48	11,12,13,14	RONALD COLEMAN, et al
49	12	W.C. COLEMAN
50	12	RONALD K. COLEMAN
51	11,14	JAMES R. AND MAE F. MINTZ
53	14	ANNIE R. HASAN
53A	14	LEOMI HARRINGTON
53B	11	NELLIE E. EVANS McKINNIE
55-116		**NOT USED**
117	13	W. C. COLEMAN
118	13	JUDITH DYER MERCER
119	13	MABEL LOUISE COOPER WILLIAMS
120	13	EDGARDO F. JOSE
121	13,14	JOE D. JONES
122	13	ANNIE LOU BROCK
123	13	CAROLINA TELEPHONE AND TELEGRAPH CO.
124	13	ANNIE R. HASSAN
125	13,14	JAN J. AND FREIDA STREK
125A	13	W. C. COLEMAN
126	14	MARY ALICE WHITTED McRAE AND NATHALENE M. LEE

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
127	14	ANNIE R. AND DAVID K. HASAN
128	14,15	W. C. COLEMAN
129	16	PAUL THOMPSON DEVELOPMENT, CORP.
129A	16	TOM McLEAN, HEIRS

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	4
R /W SHEET NO. 4 (X-0002C)	

METRIC

5 0 10

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER R. REID

6-3-10

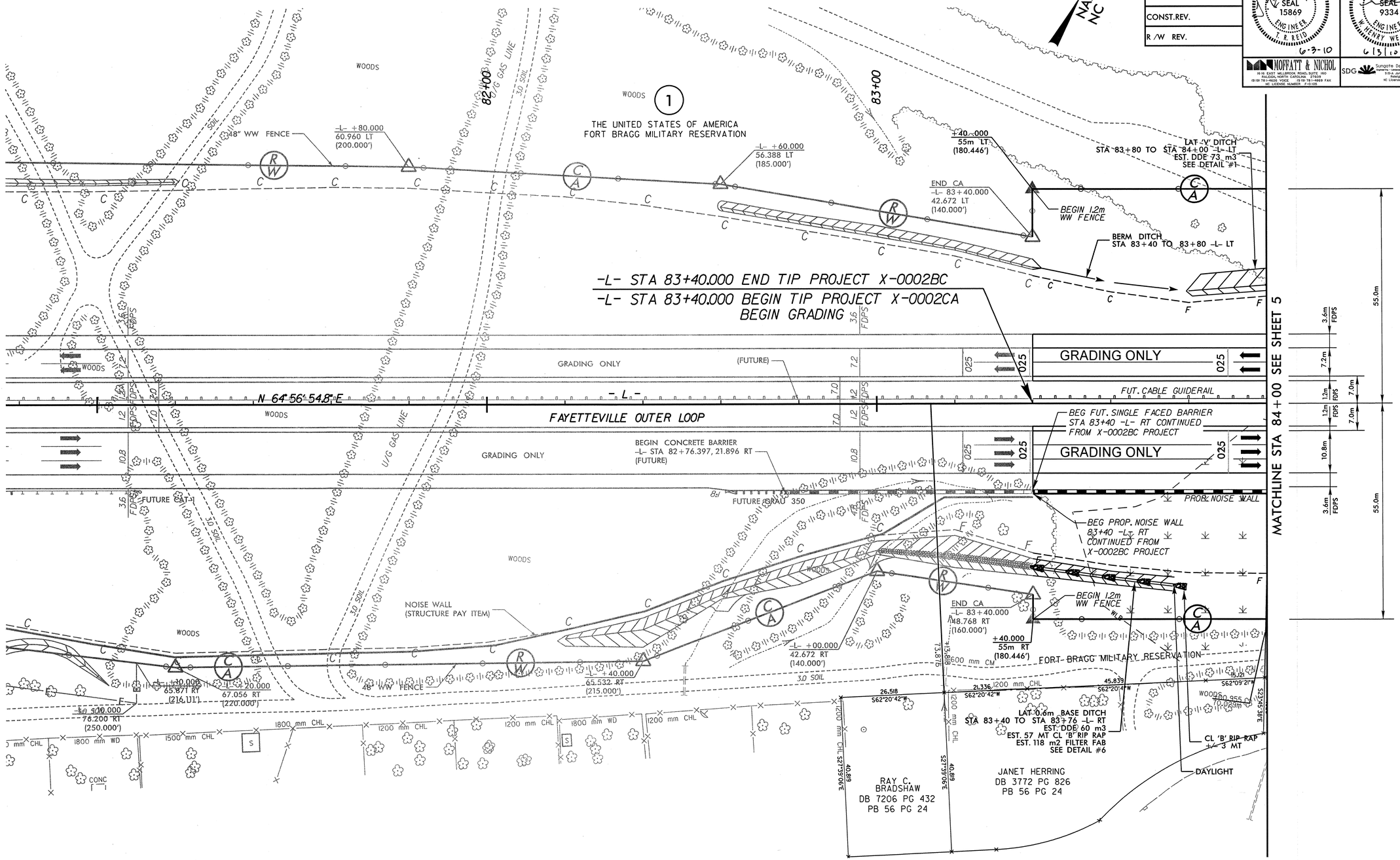
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.

6/3/10

MOFFATT & NICHOL
16 W. EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A.
Engineering | Landscape Architecture | Environmental
915-A Jones Franklin Rd.
Raleigh, N.C. 27606
NC License Number C-0910



FOR DITCH DETAILS SEE SHEET 2-K
FOR -L- PROFILE SEE SHEET 17
SEE W-1 THRU W-4 FOR WALL PLANS

8/17/99

rtvr-6/23/2010
cpcole
c:\pwworking\cpc\x0002ca_rdy_pst04.dgn

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	5
R/W SHEET NO.	5 (X-0002C)

METRIC

5 0 10

CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

6/3/10

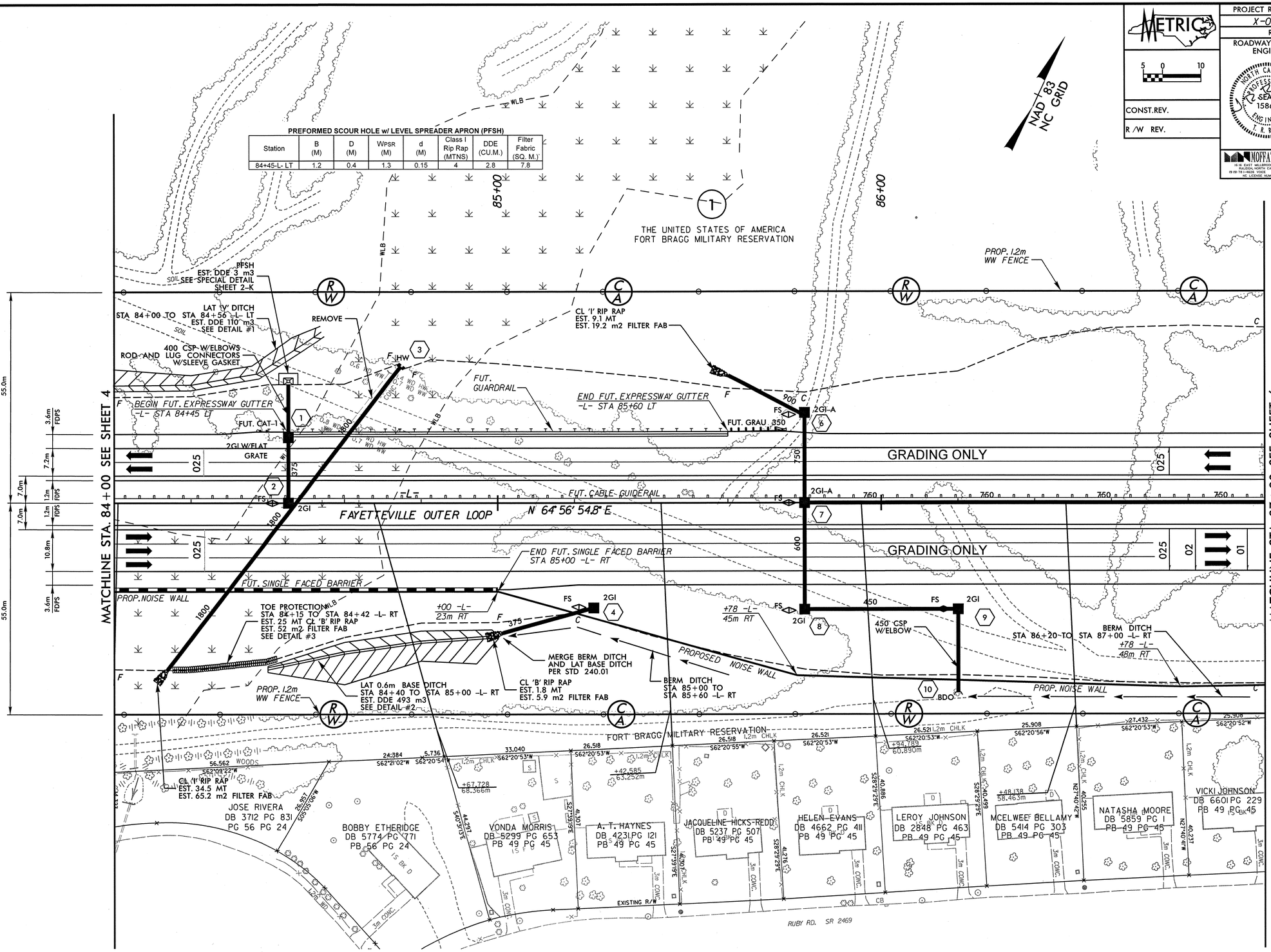
MOFFATT & NICHOL

16 16 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 781-4626 VOICE (919) 781-4869 FAX NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A. Engineering • Landscape Architecture • Environmental 915-A Jones Franklin Rd. Raleigh, N.C. 27606 NC License Number C-0830

PREFORMED SCOUR HOLE w/ LEVEL SPREADER APRON (PFSH)

Station	B (M)	D (M)	WPSR (M)	d (M)	Class I Rip Rap (MTNS)	DDE (CU.M.)	Filter Fabric (SQ. M.)
84+45-L- LT	1.2	0.4	1.3	0.15	4	2.8	7.8



FOR DITCH DETAILS SEE SHEET 2-K
FOR -L- PROFILE SEE SHEET 17
SEE W-1 THRU W-4 FOR WALL PLANS

6/3/2010
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cpowell

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	6
R /W SHEET NO. 6 (X-0002C)	

METRIC 5 0 10

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER R. R. REID 6-3-10

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR. 6/3/10

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
919 781-4626 VOICE 919 781-4628 FAX
NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A.
Engineering · Landscape Architecture · Environmental
518-A Jones Franklin Rd.
Raleigh, NC 27606
NC License Number C-0850

THE UNITED STATES OF AMERICA
FORT BRAGG MILITARY RESERVATION

NAD 83 NC GRID

-L- TS 87+08.975

-L- SC 87+69.975

+08.975 55m LT (180.446')

+69.975 55m LT (180.446')

CHORD

PROP. 1.2m WW FENCE

MATCHLINE STA. 87+00 SEE SHEET 5

MATCHLINE STA. 90+00 SEE SHEET 7

GRADING ONLY

FAYETTEVILLE OUTER LOOP

FUT. CABLE GUIDERAIL

FUT. CAT-1

FUT. GRAU 350

450 CSP W/ELBOW

BERM DITCH STA 88+40 TO 89+20 -L- RT

+67 -L- 47 RT

+34 -L- 43 RT

+34.800 -L- 54.650 RT

+30.000 55m RT (180.446')

+08.975 55m RT (180.446')

+69.975 EX. PL

+41.848 EX. PL

PROP. NOISE WALL

FORT BRAGG MILITARY RESERVATION

CHARLES LUCAS DB 5943 PG 397 PB 49 PG 45

TOMMIE L. PURIFIE DB 4127 PG 839 PB 49 PG 45

ANTHONY NETTEY-MARBELL DB 5844 PG 816 PB 49 PG 45

SAMUEL DAVIS DB 5117 PG 550 PB 49 PG 45

KWAMI B. TUPRAH DB 3425 PG 356 PB 49 PG 45

JAMES BLUE JR. DB 3628 PG 428 PB 49 PG 45

MERLE MILLER DB 4080 PG 776 PB 49 PG 45

DORIS HEARTFIELD DB 3373 PG 821 PB 49 PG 45

BARBARA MCNEILL-PHASON DB 5500 PG 429 PB 49 PG 45

JAMES BURCELL DB 4508 PG 398 PB 49 PG 45

FRANK JACKSON JR. DB 4319 PG 343 PB 49 PG 45

GWENDOLYN LAWRENCE DB 5936 PG 606 PB 49 PG 45

EXISTING R/W

RUBY RD. SR 2469 7m BST

-L-

PIs Sta 87+49.642	PI Sta 95+94.173
Θs = 1°14' 53.6"	Δ = 60° 58' 18.3" (LT)
Ls = 61.000	L = 1,489.821
LT = 40.668	T = 824.198
ST = 20.334	R = 1,400.000
	SE = 0.045
	RO = 61.000
	DS = 110 kph

FOR -L- PROFILE SEE SHEET 18
SEE W-1 THRU W-4 FOR WALL PLANS

8/17/99

6/3/2010
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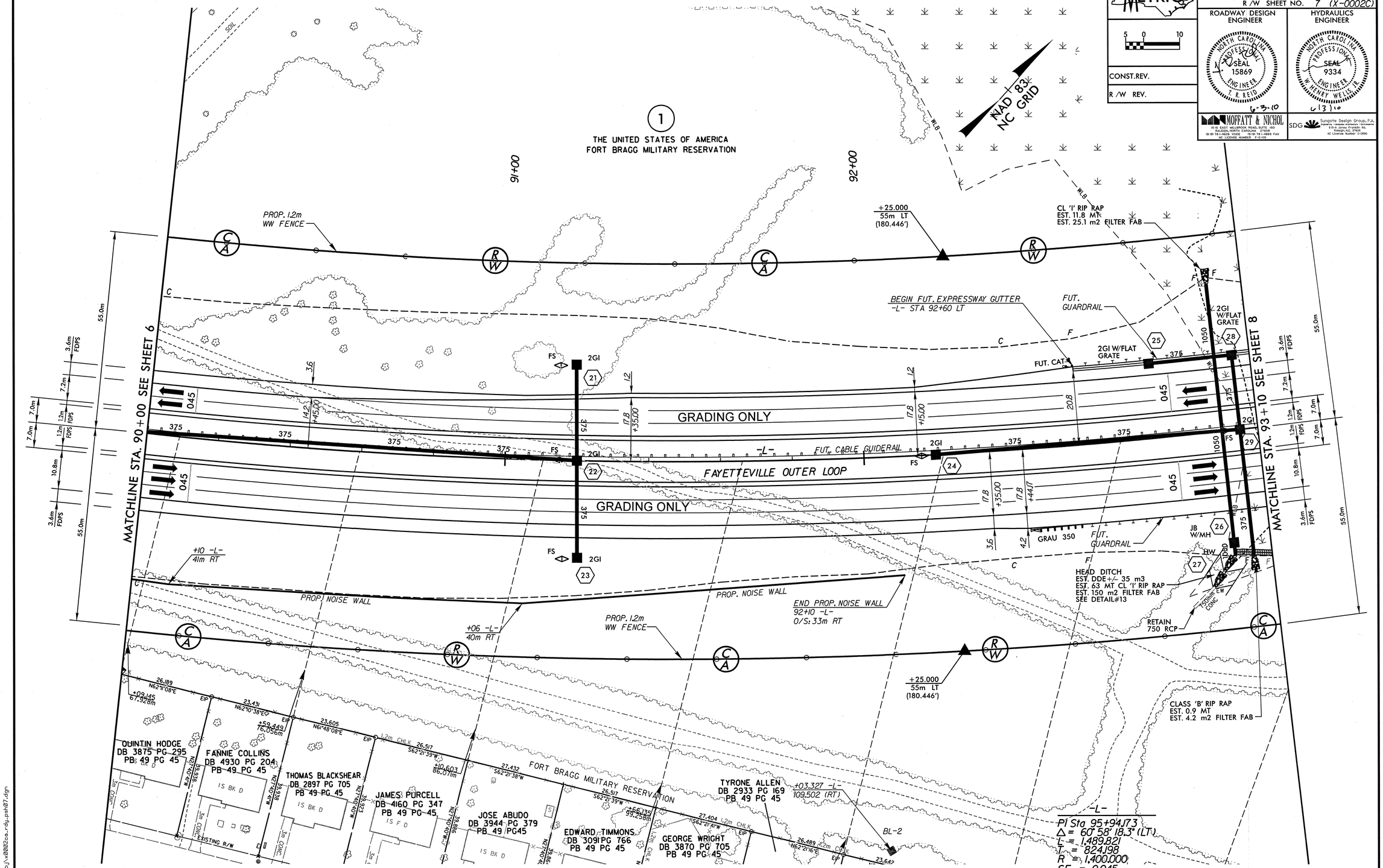


METRIC
PROJECT REFERENCE NO.
X-0002CA
SHEET NO.
7
R/W SHEET NO. 7 (X-0002C)
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.REV.
R/W REV.
MOFFATT & NICHOL
SDG
THE UNITED STATES OF AMERICA
FORT BRAGG MILITARY RESERVATION
NAD 83
NC GRID
91+00
92+00
PROP. 1.2m WW FENCE
+25.000
55m LT
(180.446')
CL 'I' RIP RAP
EST. 11.8 MT
EST. 25.1 m2 FILTER FAB
BEGIN FUT. EXPRESSWAY GUTTER
-L- STA 92+60 LT
FUT. GUARDRAIL
2GI W/FLAT GRATE
FUT. CAT
GRADING ONLY
FUT. CABLE GUIDERAIL
FAYETTEVILLE OUTER LOOP
MATCHLINE STA. 90+00 SEE SHEET 6
MATCHLINE STA. 93+10 SEE SHEET 8
GRAU 350
JB W/MH
HEAD DITCH
EST. DDE+/- 35 m3
EST. 63 MT CL 'I' RIP RAP
EST. 150 m2 FILTER FAB
SEE DETAIL#13
RETAIN
750 RCP
+10 -L-
41m RT
PROP. NOISE WALL
END PROP. NOISE WALL
92+10 -L-
O/S: 33m RT
+06 -L-
40m RT
CLASS 'B' RIP RAP
EST. 0.9 MT
EST. 4.2 m2 FILTER FAB
QUINTIN HODGE
DB 3875 PG 295
PB 49 PG 45
FANNIE COLLINS
DB 4930 PG 204
PB 49 PG 45
THOMAS BLACKSHEAR
DB 2897 PG 705
PB 49 PG 45
JAMES PURCELL
DB 4160 PG 347
PB 49 PG 45
JOSE ABUDO
DB 3944 PG 379
PB 49 PG45
EDWARD TIMMONS
DB 3091 PG 766
PB 49 PG 45
GEORGE WRIGHT
DB 3870 PG 705
PB 49 PG 45
TYRONE ALLEN
DB 2933 PG 169
PB 49 PG 45
+03.327 -L-
109.502 (RT)
FORT BRAGG MILITARY RESERVATION
BL-2
-L-
PI Sta 95+94.173
Δ = 60° 58' 18.3" (LT)
L = 1,489.821
T = 824.198
R = 1,400.000
SE = 0.045
RO = 61.000
DS = 110 kph
FOR DITCH DETAILS SEE SHEET 2-K
FOR -L- PROFILE SEE SHEET 18
SEE W-1 THRU W-4 FOR WALL PLANS

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	8
R/W SHEET NO. 8 (X-0002C)	

METRIC

5 0 10

CONST. REV.

R/W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER R. REID

6-3-10

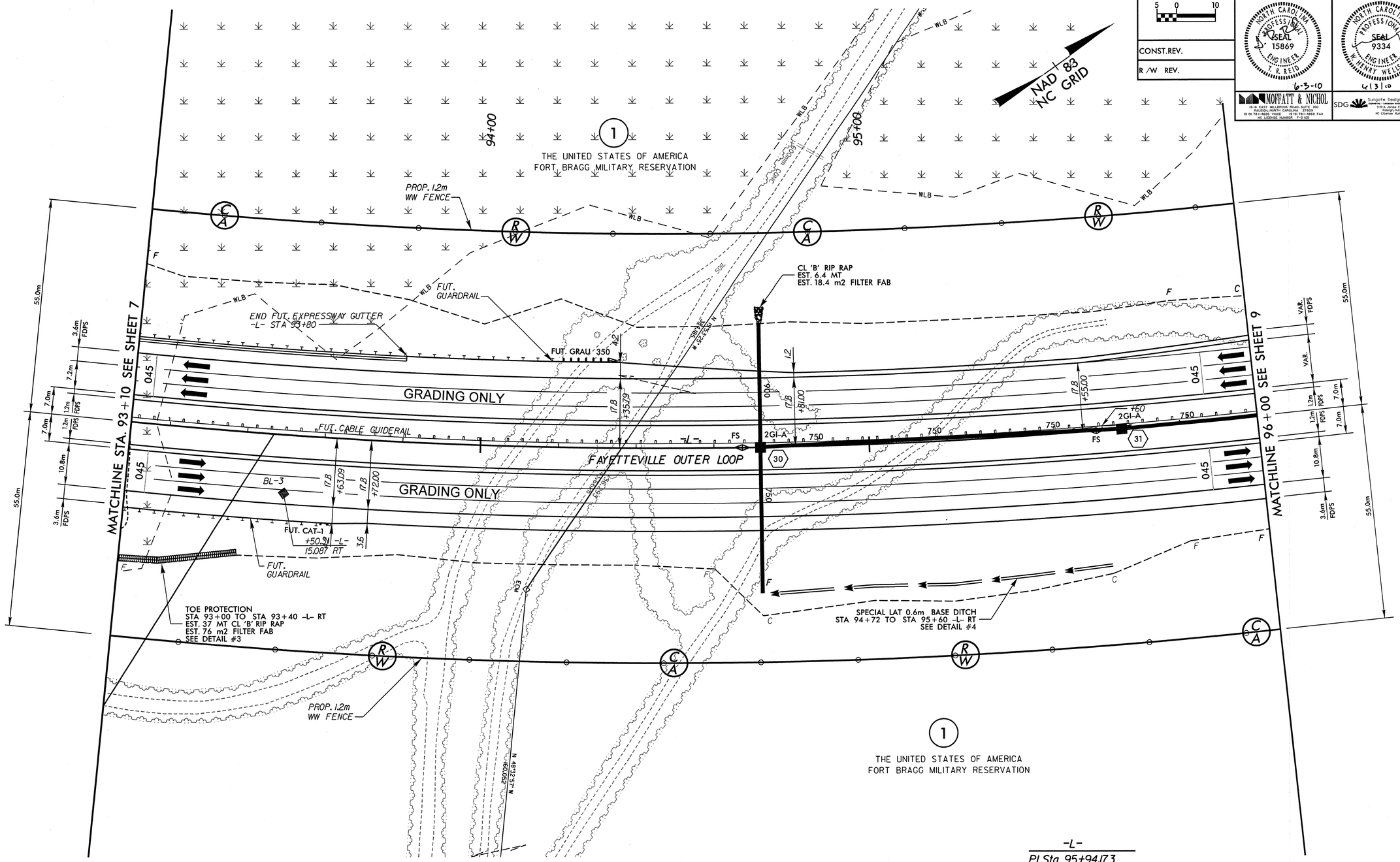
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WELLS, JR.

6/3/10

MOFFATT & NICHOL
16 W. EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4669 FAX
NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A.
Engineering • Landscape Architecture • Environmental
915-A Jones Franklin Rd.
Raleigh, N.C. 27606
NC License Number C-0910



-L-

PI Sta 95+94.173
Δ = 60° 58' 18.3" (LT)
L = 1,489.821
T = 824.198
R = 1,400.000
SE = 0.045
RO = 61.000
DS = 110 kph

FOR DITCH DETAILS SEE SHEET 2-K
FOR -L- PROFILE SEE SHEET 19

8/17/98
6/4/2010
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cpowell

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	9
R /W SHEET NO.	9 (X-0002C)

METRIC 5 0 10

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID — 6-3-10

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER HENRY WEISS JR. — 6/3/10

MOFFATT & NICHOL — 1616 EAST MILLBROOK ROAD, SUITE 160, RALEIGH, NORTH CAROLINA 27609 — 919/781-1022 VOICE 919/781-1308 FAX — NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A. — formerly Lawson Kirkpatrick / Stockwell — 315-A Jones Franklin Rd., Raleigh, N.C. 27606 — NC License Number C-0910

-Y-RPB
PIs Sta 0+53.904
Θs = 1° 51' 35.3"
Θs = 7° 09' 45.7"
Ls = 90.000
LT = 53.904
ST = 36.270

PI Sta 2+42.595
Δ = 45° 56' 30.8" (LT)
L = 288.661
T = 152.595
R = 360.000
SE = 0.08
RO = 90.000
DS = 80 kph

-Y-RPC
PIs Sta 0+30.003
Θs = 1° 49' 06.7"
Ls = 90.000
LT = 60.003
ST = 30.003

NAD 83 NC GRID

1 THE UNITED STATES OF AMERICA FORT BRAGG MILITARY RESERVATION

-Y-RPC CS 0+00.000 = -L- POC 96+93.589 (14.200m LT)

-Y-RPB CS 0+00.000 = -L- POC 97+20.000 (17.800m RT)

-Y-RPB SC 0+90.000

-Y-RPC ST 0+90.000

+93.589 55m LT (180.446')

+35.218 -L- 36.964 LT

PROP. 1.2m WW FENCE

BL-4

CL 'B' RIP RAP EST +/- 3MT

+90.000 39m LT (127.952')

+36.000 32m LT (104.987')

1+83.100 75.616m LT (248.08')

1+73.090 R/W

DANGER TREE LIMIT

MATCHLINE STA. 2+00 -Y-RPB SEE SHEET 10

MATCHLINE STA. 96+00 SEE SHEET 8

MATCHLINE STA 99+10 SEE SHEET 10

MATCHLINE STA. 1+90 -Y-RPC

GRADING ONLY

FAYETTEVILLE OUTER LOOP

FUT. CABLE GUIDERAIL

FUT. CAT-1

FUT. GRAU 350

+07.945 -L- 20.763 LT

BL-21

N 27° 03' 58.9" E

SPECIAL DITCH GRADE STA 1+62 – 1+82-Y- RAMP C RT SEE PROFILE FOR GRADE

+00.000 37.291 RT (122.346')

+90.000 25m RT (82.021')

1+55.310 R/W

1+83.439 25.000m (82.02')

1+88.289 46.393m (152.21')

1+65.480 69.869m RT (229.23')

-L-
PI Sta 95+94.173
Δ = 60° 58' 18.3" (LT)
L = 1,489.821
T = 824.198
R = 1,400.000
SE = 0.045
RO = 61.000
DS = 110 kph

FOR -L- PROFILE SEE SHEET 19
FOR -Y-RPB PROFILE SEE SHEET 25
FOR -Y-RPC PROFILE SEE SHEET 27

8/17/99

6/3/2010
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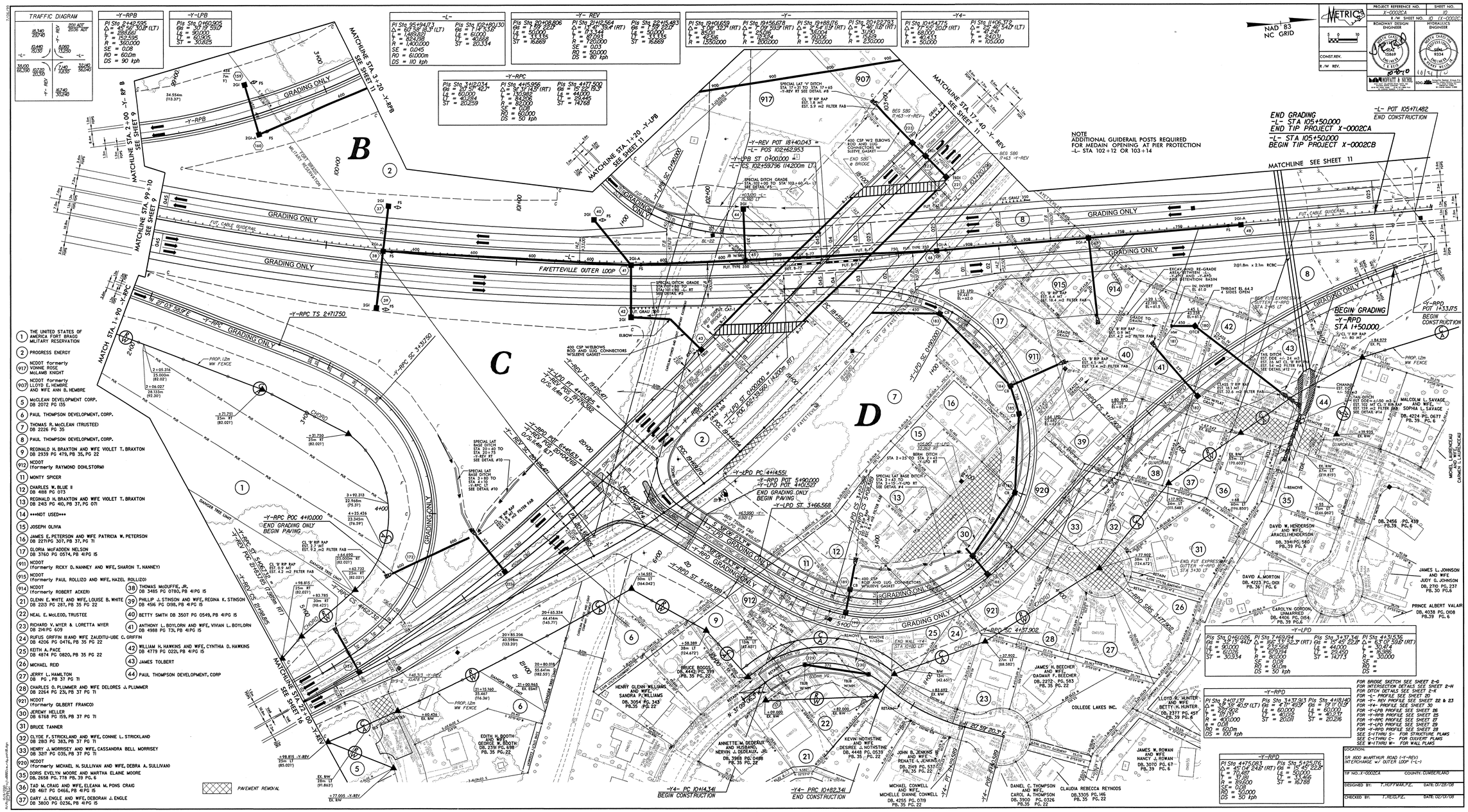
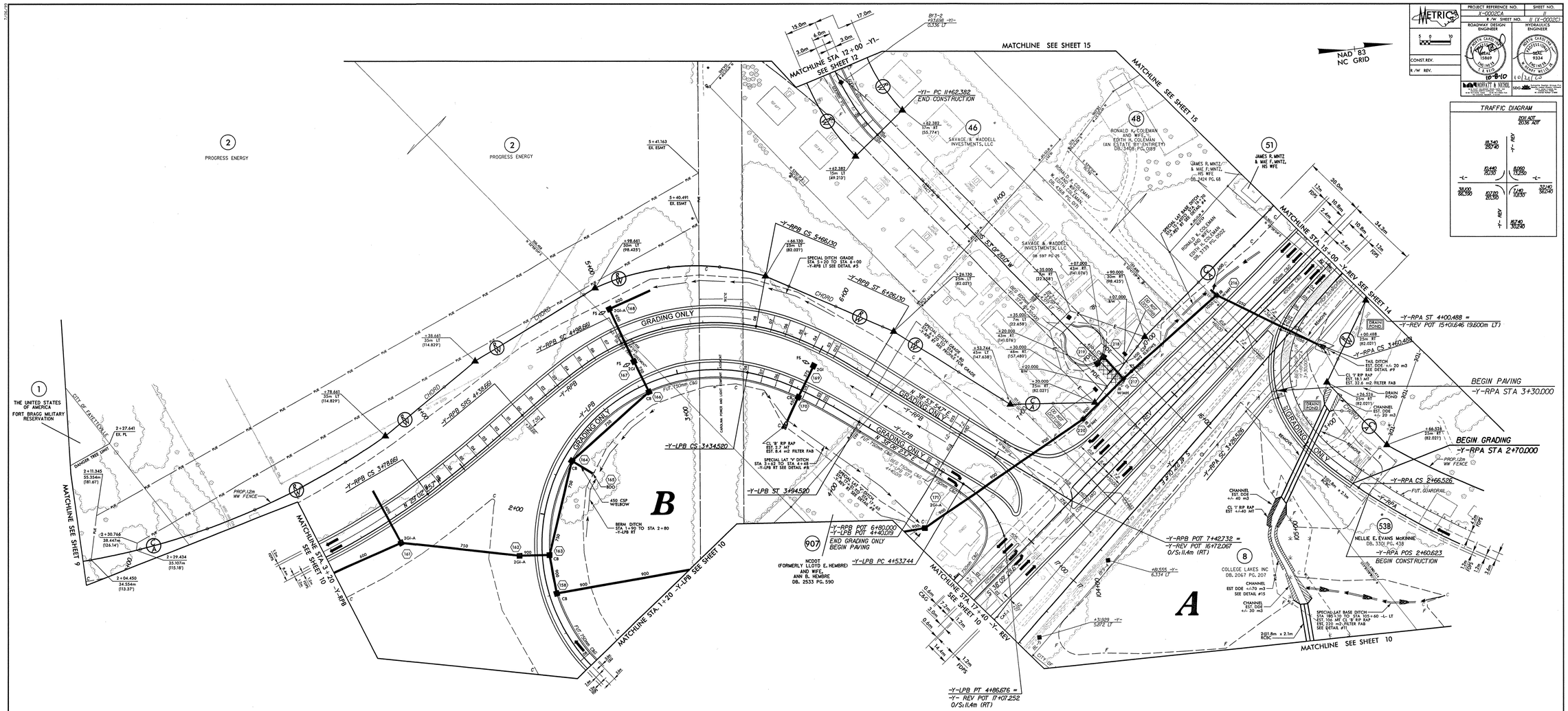
cpowell


NAD 83
NC GRID
METRIC
PROJECT REFERENCE NO. X-0002CA
SHEET NO. 10
R/W SHEET NO. 10 (X-0002C)
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.REV.
R/W REV.
HOFFATT & NICHOL
TRAFFIC DIAGRAM
-Y-RPB
PI Sta 8+42.655
Δ = 45°58'30.8" (LT)
L = 288.661
T = 152.595
R = 360.000
SE = 0.08
RD = 600.0m
DS = 90 kph
-Y-LPB
PIs Sta 0+60.925
Δ = 30°15'59.0"
L = 90.000
T = 60.905
ST = 30.825
-L-
PI Sta 95+94.73
Δ = 167°58'31.3" (LT)
L = 1,468.82
T = 822.98
R = 1,400.000
SE = 0.045
RD = 610.000m
DS = 110 kph
PIs Sta 102+80.30
Δ = 1°4'33.0"
L = 61.000
T = 30.500
ST = 30.334
-Y- REV
PIs Sta 20+08.806
Δ = 1°59'22.0"
L = 50.000
T = 13.335
ST = 16.869
PI Sta 21+12.564
Δ = 13°41'33.4" (RT)
L = 71.344
T = 37.093
R = 120.000
SE = 0.03
RD = 50.000
DS = 80 kph
PIs Sta 22+15.493
Δ = 1°59'22.0"
L = 50.000
T = 13.335
ST = 16.869
-Y-
PI Sta 19+01.659
Δ = 2°06'12.7" (RT)
L = 85.01
T = 42.516
R = 1,550.000
PI Sta 19+46.676
Δ = 1°09'29.5" (RT)
L = 25.016
T = 12.524
R = 200.000
PI Sta 19+88.176
Δ = 5°24'11.9" (RT)
L = 36.004
T = 18.005
R = 750.000
PI Sta 20+22.793
Δ = 7°46'11.8" (RT)
L = 31.50
T = 15.789
R = 230.000
-Y4-
PI Sta 10+54.775
Δ = 17°55'20.2" (RT)
L = 68.00
T = 40.433
R = 50.000
PI Sta 11+26.372
Δ = 52°46'54.2" (LT)
L = 41.246
T = 24.031
R = 105.000
-Y-RPC
PIs Sta 3+12.034
Δ = 20°51'46.7"
L = 60.000
T = 30.984
ST = 30.259
PI Sta 4+15.956
Δ = 11°31'14.5" (RT)
L = 130.982
T = 64.926
R = 652.000
SE = 0.08
RD = 60.000
DS = 50 kph
PIs Sta 4+77.500
Δ = 15°52'15.3"
L = 64.005
T = 32.445
ST = 14.768
-Y-LPD
PIs Sta 0+16.026
Δ = 45°04'24.8" (RT)
L = 70.487
T = 37.181
R = 89.600
SE = 0.08
RD = 50.000
DS = 50 kph
PI Sta 7+69.94
Δ = 166°33'52.3" (RT)
L = 212.568
T = 879.194
R = 80.000
SE = 0.08
RD = 910.0m
DS = 50 kph
PIs Sta 3+37.341
Δ = 15°45'22.8"
L = 44.00
T = 29.450
ST = 14.773
PI Sta 4+31.536
Δ = 63°01'59.6" (RT)
L = 30.414
T = 16.986
R = 30.000
SE =
RD =
DS =
-Y-RPD
PI Sta 2+07.137
Δ = 32°39'40.5" (LT)
L = 297.902
T = 171.131
R = 420.000
SE = 0.08
RD = 610.0m
DS = 100 kph
PIs Sta 3+37.913
Δ = 4°17'49.9"
L = 60.000
T = 40.010
ST = 20.011
PIs Sta 4+18.140
Δ = 19°11'01.9"
L = 60.000
T = 40.212
ST = 20.216
-Y-RPD
PI Sta 4+75.083
Δ = 45°04'24.8" (RT)
L = 70.487
T = 37.181
R = 89.600
SE = 0.08
RD = 50.000
DS = 50 kph
PIs Sta 5+25.176
Δ = 15°45'22.8"
L = 50.000
T = 33.466
ST = 16.788
FOR BRIDGE SKETCH SEE SHEET 2-G
FOR INTERSECTION DETAILS SEE SHEET 2-H
FOR DITCH DETAILS SEE SHEET 2-K
FOR -L- PROFILE SEE SHEET 25
FOR -Y- REV PROFILE SEE SHEET 22 & 23
FOR -Y4- PROFILE SEE SHEET 30
FOR -Y-LPB PROFILE SEE SHEET 26
FOR -Y-RPB PROFILE SEE SHEET 25
FOR -Y-RPC PROFILE SEE SHEET 27
FOR -Y-LPD PROFILE SEE SHEET 29
FOR -Y-RPD PROFILE SEE SHEET 28
SEE S-1THRU S- FOR STRUCTURE PLANS
SEE C-1THRU C- FOR CULVERT PLANS
SEE W-1THRU W- FOR WALL PLANS
LOCATION:
SR 1500 MCARTHUR ROAD (-Y-REV)
INTERCHANGE w/ DITCH LOOP (-L-)
TIP NO. X-0002CA
COUNTY: CUMBERLAND
DESIGNED BY: T.HUFFMAN,P.E.
DATE: 01/28/08
CHECKED BY: T.REID,P.E.
DATE: 02/01/08
END GRADING
-L- STA 105+50.000
END TIP PROJECT X-0002CA
-L- STA 105+50.000
BEGIN TIP PROJECT X-0002CB
-L- POT 105+71.482
END CONSTRUCTION
NOTE
ADDITIONAL GUIDERAIL POSTS REQUIRED
FOR MEDAIN OPENING AT PIER PROTECTION
-L- STA 102+12 OR 103+14
MATCHLINE SEE SHEET 11
BEGIN GRADING
-Y-RPD
STA 1+50.000
-Y-RPD
POT 1+33.175
BEGIN
CONSTRUCTION
B
C
D
GRADING ONLY
FAYETTEVILLE OUTER LOOP
-Y-RPB
-Y-RPC
-Y-LPB
-Y-LPD
-Y-REV
-Y-RPD
-Y-RPC POC 4+10.000
END GRADING ONLY
BEGIN PAVING
-Y-LPD ST. 3+66.568
END GRADING ONLY
BEGIN PAVING
-Y-LPD PC 4+14.551
-Y-RPD POT 5+90.000
-Y-LPD POT. 4+00.507
-Y-RPD SC 4+57.902
-Y-RPD ST 5+58.369
-Y-REV TS 19+25.471
-Y-REV POT 18+40.043
-Y-LPB ST 0+00.000
-L- CS 102+59.796 (14,200m LT)
-Y-RPC TS 2+71.750
-Y-RPC SC 3+37.750
-Y-LPD SC 0+90.000
-Y-LPD ST 0+00.000
-L- POS 102+62.953
-Y-REV POT 18+40.043
-Y-RPD POT 6+46.631
-Y-REV POS 20+04.819
-Y-REV SC 20+42.81
-Y-REV CS 21+63.32
-Y-REV PCC 21+63.32
-Y-REV CS 21+98.85
-Y-REV TS 22+00.00
-Y-REV
-Y-Y4- PC 10+14.341
BEGIN CONSTRUCTION
-Y-Y4- PRC 10+82.341
END CONSTRUCTION
-Y-Y4- POT 11+26.372
-Y-Y4- PT 11+29.599
1 THE UNITED STATES OF AMERICA FORT BRAGG MILITARY RESERVATION
2 PROGRESS ENERGY
917 NCDOT formerly VONNIE ROSE McLAMB KNIGHT
907 NCDOT formerly LLOYD E. HEMBRE AND WIFE ANN B. HEMBRE
5 McCLEAN DEVELOPMENT CORP. DB 2072 PG 135
6 PAUL THOMPSON DEVELOPMENT, CORP.
7 THOMAS R. McCLEAN (TRUSTEE) DB 2226 PG 35
8 PAUL THOMPSON DEVELOPMENT, CORP.
9 REGINALD H. BRAXTON AND WIFE VIOLET T. BRAXTON DB 2939 PG 479, PB 35, PG 22
912 NCDOT (formerly RAYMOND DOHLSTORM)
11 MONTY SPICER
12 CHARLES W. BLUE II DB 488 PG 073
13 REGINALD H. BRAXTON AND WIFE VIOLET T. BRAXTON DB 2413 PG 40, PB 37, PG 07!
14 ***NOT USED***
15 JOSEPH OLIVIA
16 JAMES E. PETERSON AND WIFE PATRICIA W. PETERSON DB 2271PG 307, PB 37, PG 71
17 GLORIA McFADDEN NELSON DB 3760 PG 0574, PB 41PG 15
911 NCDOT (formerly RICKY D. NANNEY AND WIFE, SHARON T. NANNEY)
915 NCDOT (formerly PAUL ROLLIZO AND WIFE, HAZEL ROLLIZO)
914 NCDOT (formerly ROBERT ACKER)
21 GLENN E. WHITE AND WIFE, LOUISE B. WHITE DB 2213 PG 287, PB 35 PG 22
22 NEAL E. McLEOD, TRUSTEE
23 RICHARD V. MYER & LORETTA MYER DB 2141PG 609
24 RUFUS GRIFFIN III AND WIFE ZAUDITU-UBE C. GRIFFIN DB 4206 PG 0476, PB 35 PG 22
25 KEITH A. PACE DB 4874 PG 0820, PB 35 PG 22
26 MICHAEL REID
27 JERRY L. HAMILTON DB PG , PB 37 PG 71
28 CHARLES O. PLUMMER AND WIFE DELORES J. PLUMMER DB 2264 PG 23, PB 37 PG 71
921 NCDOT (formerly GILBERT FRANCO)
30 JEREMY HELLER DB 6768 PG 159, PB 37 PG 71
31 BRUCE TANNER
32 CLYDE F. STRICKLAND AND WIFE, CONNIE L. STRICKLAND DB 2813 PG 383, PB 37 PG 71
33 HENRY J. MORRISEY AND WIFE, CASSANDRA BELL MORRISEY DB 3217 PG 035, PB 37 PG 71
920 NCDOT (formerly MICHAEL N. SULLIVAN AND WIFE, DEBRA A. SULLIVAN)
35 DORIS EVELYN MOORE AND MARTHA ELAINE MOORE DB. 2658 PG. 778 PB. 39 PG. 6
36 TAD M. CRAIG AND WIFE, ELEANA M. PONS CRAIG DB 4617 PG 0466, PB 41PG 15
37 GARY J. ENGLE AND WIFE, DEBORAH J. ENGLE DB 3800 PG 0236, PB 41PG 15
38 THOMAS McDUFFIE, JR. DB 3485 PG 0780, PB 41PG 15
39 PHILLIP J. STINSON AND WIFE, REGINA K. STINSON DB 4516 PG 0198, PB 41PG 15
40 BETTY SMITH DB 3507 PG 0549, PB 41PG 15
41 ANTHONY L. BOYLORN AND WIFE, VIVIAN L. BOYLORN DB 4988 PG 731, PB 41PG 15
42 WILLIAM H. HAWKINS AND WIFE, CYNTHIA D. HAWKINS DB 4779 PG 0221, PB 41PG 15
43 JAMES TOLBERT
44 PAUL THOMPSON DEVELOPMENT, CORP
PAVEMENT REMOVAL
DANIEL C. THOMPSON AND WIFE, CAROL A. THOMPSON DB. 3900 PG. 0326 PB. 35 PG. 22
CLAUDIA REBECCA REYNODS DB.3305 PG.146 PB. 35 PG. 22
JAMES W. ROWAN AND WIFE NANCY J. ROWAN DB. 3070 PG. 67 PB. 39 PG. 6
COLLEGE LAKES INC.
JAMES H. BEECHER AND WIFE DAGMAR F. BEECHER DB. 2272 PG. 583 PB. 35 PG. 22
LLOYD R. HUNTER AND WIFE BETTY H. HUNTER DB. 2371 PG. 457 PB. 39 PG. 6
DAVID M. HENDERSON AND WIFE ARACELI HENDERSON DB. 3941 PG. 580 PB. 39 PG. 6
DAVID A. MORTON DB. 4223 PG. 0101 PB. 36 PG. 6
CAROLYN GORDON, UNMARRIED DB. 4406 PG. 0154 PB. 39 PG. 6
MALCOLM L. SAVAGE AND WIFE, SOPHIA L. SAVAGE DB. 4224 PG. 0677 PB. 39 PG. 6
JAMES L. JOHNSON AND WIFE, JUDY G. JOHNSON DB. 2710 PG. 237 PB. 30 PG.6
PRINCE ALBERT VALAIR DB. 4038 PG. 008 PB.39 PG. 6
MICHAEL LAMERCEAU CARMEN L. LAMERCEAU
BRUCE BOOGS DB. 4440 PG. 399 PB. 35 PG. 22
HENRY GLENN WILLIAMS AND WIFE, SANDRA P. WILLIAMS DB. 3064 PG. 343 PB.35 PG. 22
EDITH H. BOOTH GEORGE W. BOOTH DB. 2339 PG. 698 PB. 35 PG. 22
ANNETTE M. DEDEAUX AND HUSBAND, NERVIN J. DEDEAUX, JR. DB. 3969 PG. 0488 PB. 35 PG. 22
KEVIN NOTHSTINE AND WIFE, DESIREE L. NOTHSTINE DB. 4448 PG. 0539 PB. 35 PG. 22
JOHN B. JENKINS III AND WIFE RENATE L. JENKINS DB. 2149 PG. 537 PB.35 PG. 22
MICHAEL CONNELL AND WIFE, MICHELLE DIANNE CONNELL DB. 4255 PG. 0719 PB. 35 PG. 22



PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	1
R/W SHEET NO.	II (X-0002C)

ROADWAY DESIGN ENGINEER — HYDRAULICS ENGINEER

CONST.REV.

R/W REV.

MORFATT & NATHS — Gannett Fleming Group, P.A.

TRAFFIC DIAGRAM

-Y-LPB

PIs Sta 0+60.905	PI Sta 7+98.019	PIs Sta 3+54.760
Gs = 30°19'59.0"	Δ = 164°49'22.5" (RT)	Gs = 20°13'19.3"
Ls = 90.000	L = 244.520	Ls = 60.000
LT = 60.905	T = 6,38.019	LT = 40.264
ST = 30.825	R = 85.000	ST = 20.240
	e = 0.08	
	RO = 60.0m	
	DS = 50 kph	

-Y1-

PI Sta 4+70.987
Δ = 41°55'49.4" (RT)
L = 32.933
T = 17.243
R = 45.000
e = 0.06
RO = 34.0m
DS = 40 kph

-Y-RPB

PI Sta 2+42.595	PI Sta 3+98.675	PIs Sta 4+78.824	PI Sta 5+33.538	PIs Sta 5+86.371
Δ = 49°56'30.0" (LT)	Gs = 4°46'28.1"	Gs = 15°54'55.2"	Δ = 35°41'36.2" (RT)	Gs = 21°13'19.3"
L = 288.562	Ls = 60.000	Ls = 60.000	L = 67.469	Ls = 60.000
T = 152.555	LT = 40.015	LT = 40.163	T = 34.816	LT = 40.264
R = 360.000	ST = 20.013	ST = 20.148	R = 108.000	ST = 20.240
e = 0.08			e = 0.08	
RO = 60.0 m			RO = 60.0m	
DS = 90 kph			DS = 50 kph	

-Y-RPA

PIs Sta 3+05.217	PI Sta 3+44.192	PIs Sta 3+74.028
Gs = 4°37'01.3"	Δ = 38°55'03.4" (RT)	Gs = 22°55'05.9"
Ls = 60.000	L = 33.952	Ls = 60.000
LT = 18.999	T = 17.665	LT = 26.894
R = 1,29.000	R = 50.000	ST = 13.540
ST = 23.478	e = 0.08	
	RO = 50.0m	
	DS = 40 kph	

PAVEMENT REMOVAL

FOR INTERSECTION DETAILS SEE SHEET 2-1
FOR DITCH DETAILS SEE SHEET 2-K
FOR -Y- REV PROFILE SEE SHEET 22
FOR -Y1- PROFILE SEE SHEET 30
FOR -Y-RPA PROFILE SEE SHEET 24
FOR -Y-RPB PROFILE SEE SHEET 24 & 25
FOR -Y-LPB PROFILE SEE SHEET 26
SEE C-1 THRU C- FOR CULVERT PLANS

LOCATION: SR 1600 McARTHUR ROAD (-Y-REV) INTERCHANGE w/ OUTER LOOP (-L-)

TIP NO. X-0002CA — COUNTY: CUMBERLAND

DESIGNED BY: T.HUFFMAN,P.E. — DATE: 02/28/08

CHECKED BY: T.REID,P.E. — DATE: 02/05/08

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	12
R/W SHEET NO.	26 (X-0002C)

METRIC

5 0 10

CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

HYDRAULICS ENGINEER

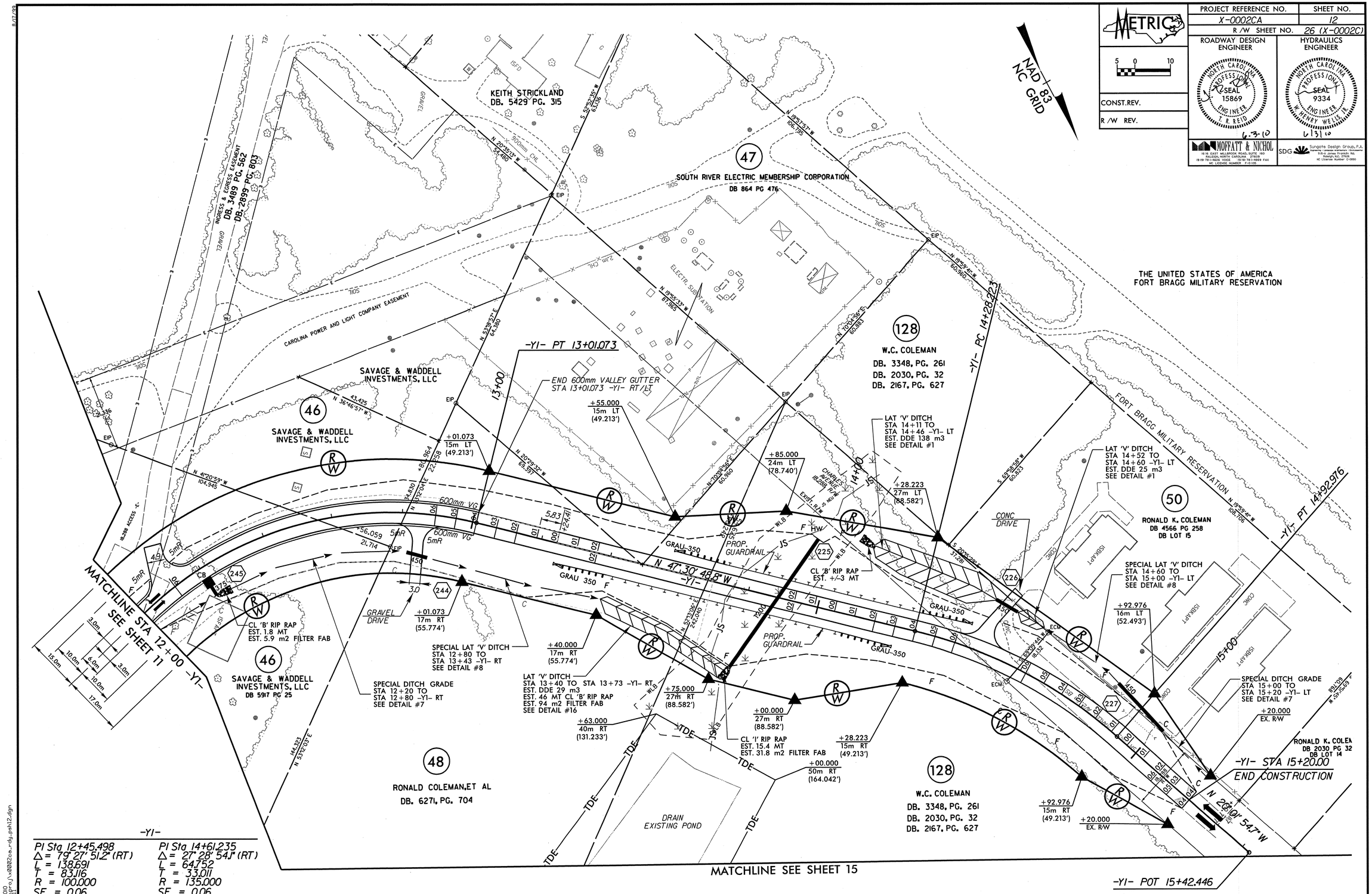
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

6/3/10

MOFFATT & NICHOL

16 16 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 781-4626 VOICE (919) 781-4669 FAX NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A. Engineering | Landscape Architecture | Environmental 915-A Jones Franklin Rd. Raleigh, N.C. 27606 NC License Number C-0890



-Y1-

PI Sta 12+45.498	PI Sta 14+61.235
Δ = 79° 27' 51.2" (RT)	Δ = 27° 28' 54.1" (RT)
L = 138.691	L = 64.752
T = 83.116	T = 33.011
R = 100.000	R = 135.000
SE = 0.06	SE = 0.06
RO = 36.000	RO = 36.000
DS = 50 kph	DS = 60 kph

FOR DITCH DETAILS SEE SHEET 2-K
FOR -Y1- PROFILE SEE SHEET 30

6/3/2010
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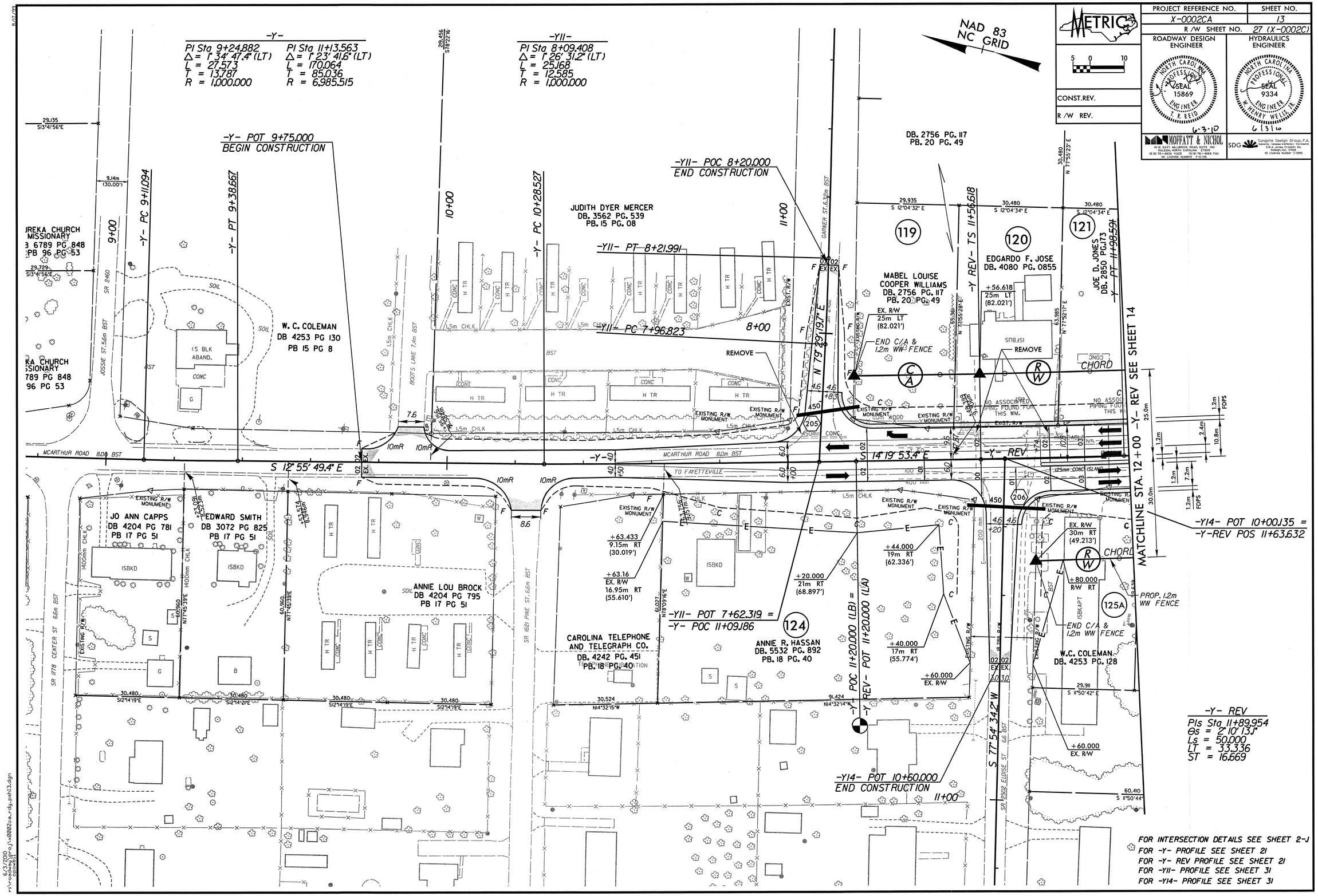
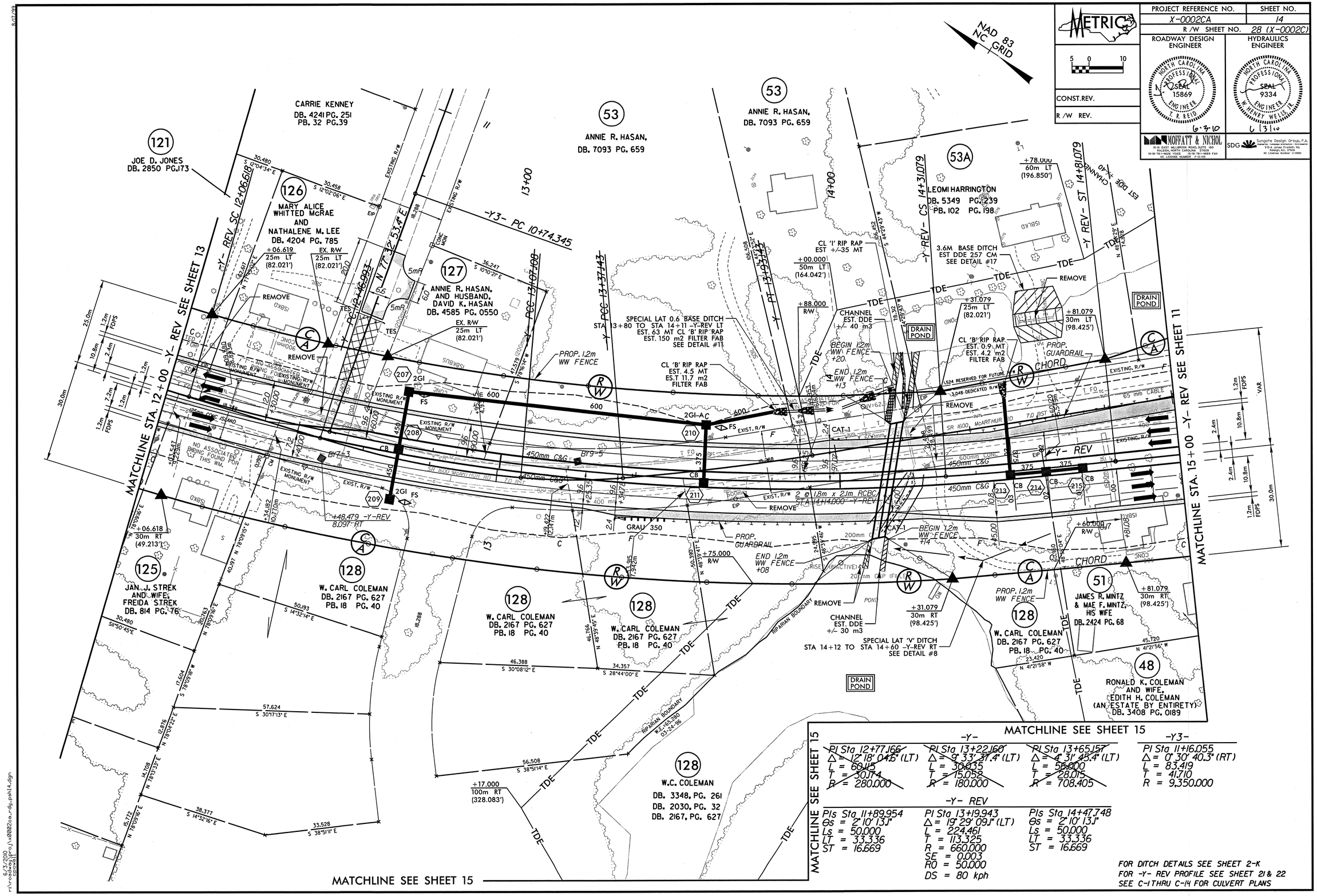


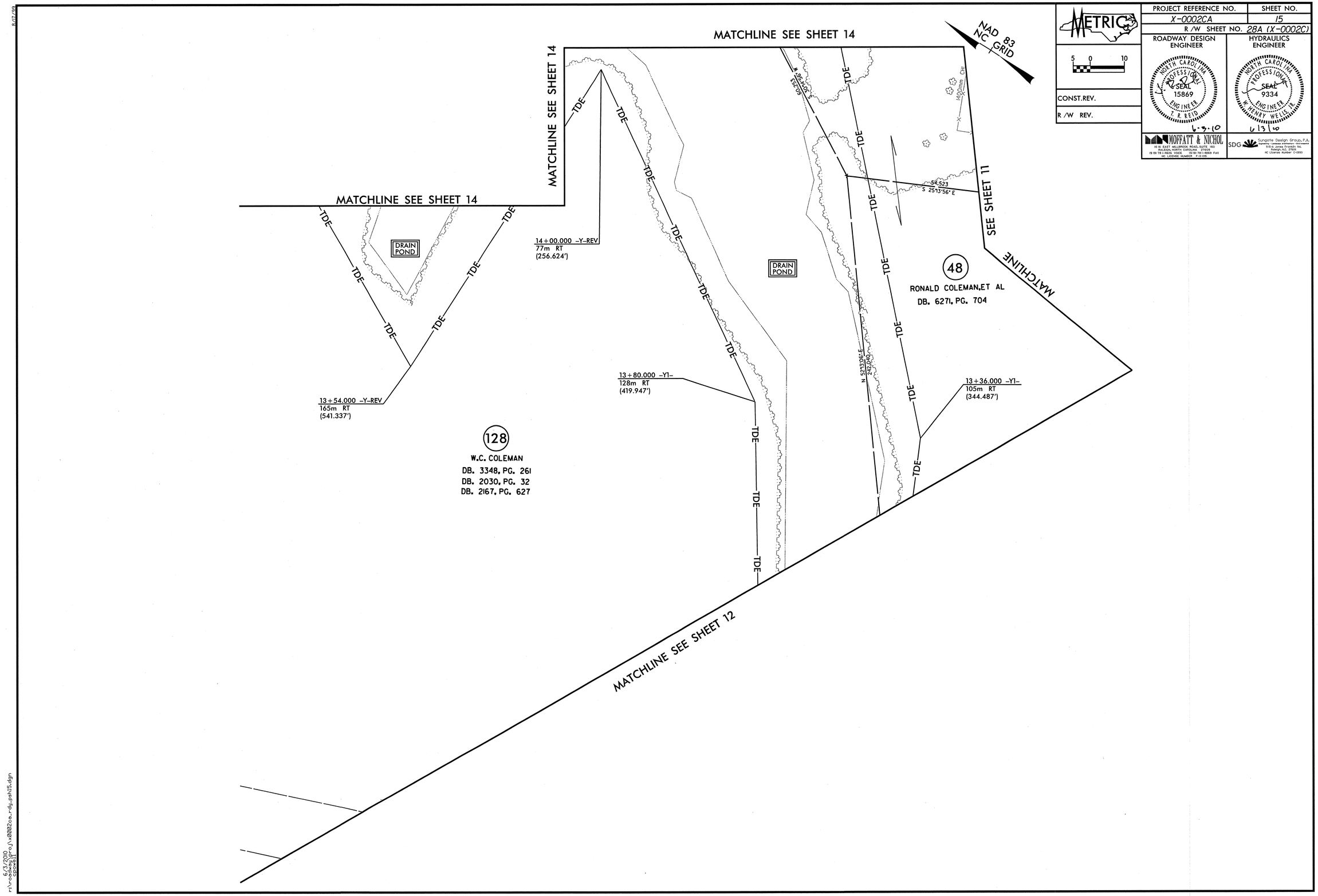
METRIC
PROJECT REFERENCE NO. X-0002CA
SHEET NO. 13
R/W SHEET NO. 27 (X-0002C)
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
CONST.REV.
R/W REV.
MOFFATT & NICHOL
SDG
NAD 83 NC GRID
-Y-
PI Sta 9+24.882
Δ = 1° 34' 47.4" (LT)
L = 27.573
T = 13.787
R = 1,000.000
PI Sta 11+13.563
Δ = 1° 23' 41.6" (LT)
L = 170.064
T = 85.036
R = 6,985.515
-Y11-
PI Sta 8+09.408
Δ = 1° 26' 31.2" (LT)
L = 25.168
T = 12.585
R = 1,000.000
-Y- POT 9+75.000
BEGIN CONSTRUCTION
-Y11- POC 8+20.000
END CONSTRUCTION
-Y11- PT 8+21.991
-Y11- PC 7+96.823
-Y- PC 9+11.094
-Y- PT 9+38.667
-Y- PC 10+28.527
JUDITH DYER MERCER
DB. 3562 PG. 539
PB. 15 PG. 08
DB. 2756 PG. 117
PB. 20 PG. 49
MABEL LOUISE COOPER WILLIAMS
DB. 2756 PG. 117
PB. 20 PG. 49
EDGARDO F. JOSE
DB. 4080 PG. 0855
JOE D. JONES
DB. 2850 PG. 173
-Y REV- TS 11+56.618
-Y REV- PT 11+98.591
W. C. COLEMAN
DB 4253 PG 130
PB 15 PG 8
JO ANN CAPPS
DB 4204 PG 781
PB 17 PG 51
EDWARD SMITH
DB 3072 PG 825
PB 17 PG 51
ANNIE LOU BROCK
DB 4204 PG 795
PB 17 PG 51
CAROLINA TELEPHONE AND TELEGRAPH CO.
DB. 4242 PG. 451
PB. 18 PG. 40
ANNIE R. HASSAN
DB. 5532 PG. 892
PB. 18 PG. 40
W.C. COLEMAN
DB. 4253 PG. 128
-Y11- POT 7+62.319 =
-Y- POC 11+09.186
-Y- POC 11+20.000 (LB) =
-Y- REV- POT 11+20.000 (LA)
-Y14- POT 10+00.135 =
-Y-REV POS 11+63.632
-Y14- POT 10+60.000
END CONSTRUCTION
-Y- REV
PIs Sta 11+89.954
Θs = 2° 10' 13.1"
Ls = 50.000
LT = 33.336
ST = 16.669
MATCHLINE STA. 12+00 -Y- REV SEE SHEET 14
S 12° 55' 49.4" E
S 14° 19' 53.4" E
N 79° 29' 19.7" E
S 77° 54' 34.2" W
MCARTHUR ROAD 8.0m BST
TO FAYETTEVILLE
REMOVE
END C/A & 1.2m WW FENCE
PROP. 1.2m WW FENCE
FOR INTERSECTION DETAILS SEE SHEET 2-J
FOR -Y- PROFILE SEE SHEET 21
FOR -Y- REV PROFILE SEE SHEET 21
FOR -Y11- PROFILE SEE SHEET 31
FOR -Y14- PROFILE SEE SHEET 31



-Y-			-Y3-
~~PI Sta 12+77.166~~	~~PI Sta 13+22.160~~	~~PI Sta 13+65.157~~	PI Sta 11+16.055
~~Δ = 12° 18' 04.6" (LT)~~	~~Δ = 9° 33' 37.4" (LT)~~	~~Δ = 4° 31' 45.4" (LT)~~	Δ = 0° 30' 40.3" (RT)
~~L = 60.115~~	~~L = 30.035~~	~~L = 56.000~~	L = 83.419
~~T = 30.174~~	~~T = 15.052~~	~~T = 28.015~~	T = 41.710
~~R = 280.000~~	~~R = 180.000~~	~~R = 708.405~~	R = 9,350.000

-Y- REV		
PIs Sta 11+89.954	PI Sta 13+19.943	PIs Sta 14+47.748
Θs = 2° 10' 13.1"	Δ = 19° 29' 09.1" (LT)	Θs = 2° 10' 13.1"
Ls = 50.000	L = 224.461	Ls = 50.000
LT = 33.336	T = 113.325	LT = 33.336
ST = 16.669	R = 660.000	ST = 16.669
	SE = 0.003	
	RO = 50.000	
	DS = 80 kph	

FOR DITCH DETAILS SEE SHEET 2-K
FOR -Y- REV PROFILE SEE SHEET 21 & 22
SEE C-1 THRU C-14 FOR CULVERT PLANS



METRIC

5 0 10

CONST.REV.

R/W REV.

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	15
R/W SHEET NO. 28A (X-0002C)	

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

6/3/10

MOFFATT & NICHOL
16 16 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A.
Engineering • Landscape Architecture • Environmental
9 Sixth Avenue Franklin Bldg.
Raleigh, N.C. 27606
NC License Number C-0850

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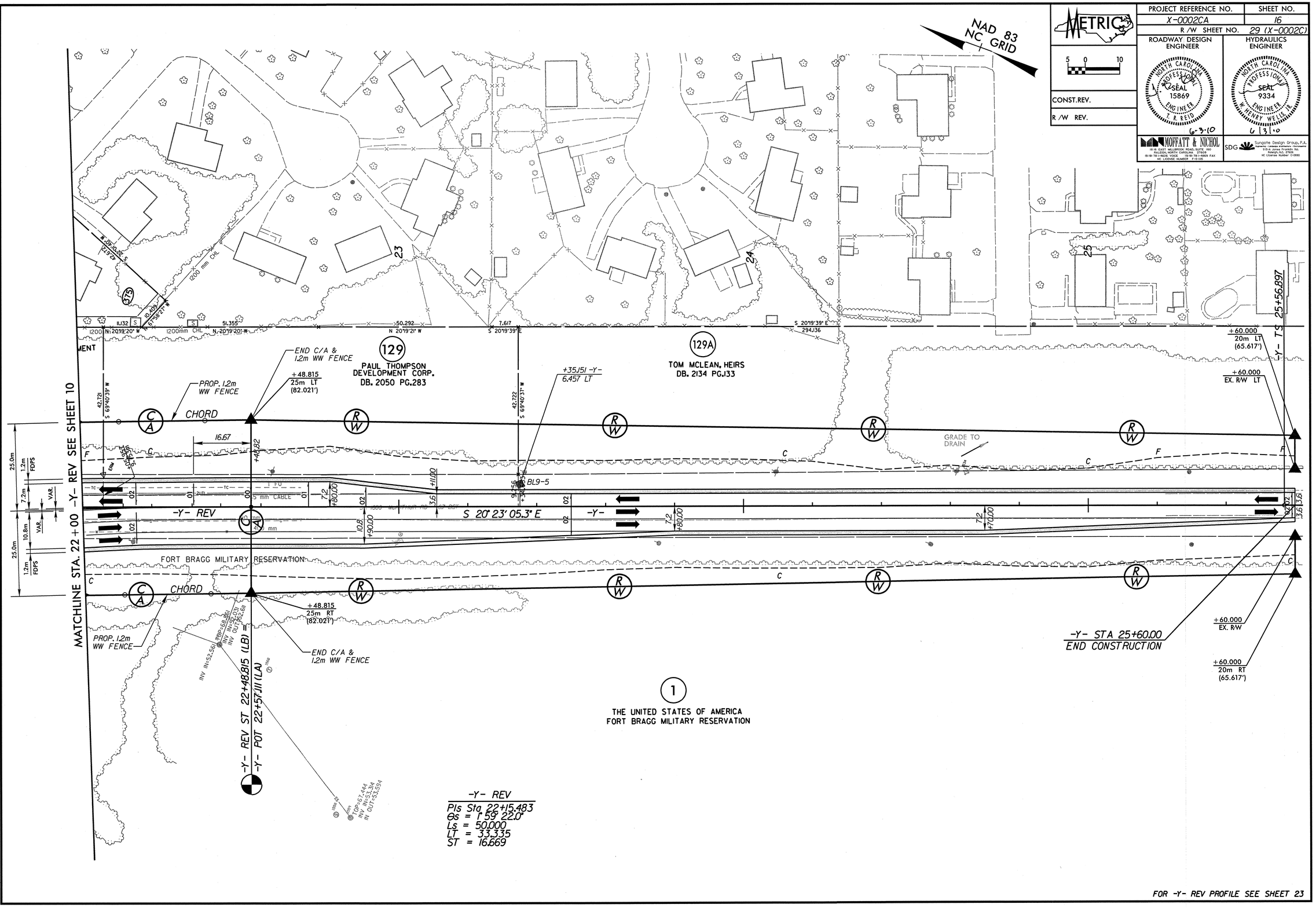


NAD 83
NC GRID
METRIC
5 0 10
CONST.REV.
R /W REV.
PROJECT REFERENCE NO.
X-0002CA
SHEET NO.
16
R /W SHEET NO.
29 (X-0002C)
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID
6-3-10
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.
6/3/10
MOFFATT & NICHOL
SDG
Sungate Design Group, P.A.
MATCHLINE STA. 22+00 -Y- REV SEE SHEET 10
129
PAUL THOMPSON
DEVELOPMENT CORP.
DB. 2050 PG.283
129A
TOM MCLEAN, HEIRS
DB. 2134 PG.133
END C/A &
1.2m WW FENCE
PROP. 1.2m
WW FENCE
+48.815
25m LT
(82.021')
+35.151 -Y-
6.457 LT
CHORD
16.67
GRADE TO DRAIN
BL9-5
-Y- REV
S 20° 23' 05.3" E
FORT BRAGG MILITARY RESERVATION
+48.815
25m RT
(82.021')
PROP. 1.2m
WW FENCE
END C/A &
1.2m WW FENCE
-Y- REV ST 22+48.815 (LB)
-Y- POT 22+57.111 (LA)
-Y- STA 25+60.00
END CONSTRUCTION
+60.000
20m LT
(65.617')
+60.000
EX. R/W LT
+60.000
EX. R/W
+60.000
20m RT
(65.617')
-Y- TS 25+56.897
1
THE UNITED STATES OF AMERICA
FORT BRAGG MILITARY RESERVATION
-Y- REV
Pls Sta 22+15.483
Θs = 1° 59' 22.0"
Ls = 50.000
LT = 33.335
ST = 16.669
FOR -Y- REV PROFILE SEE SHEET 23

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	17

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

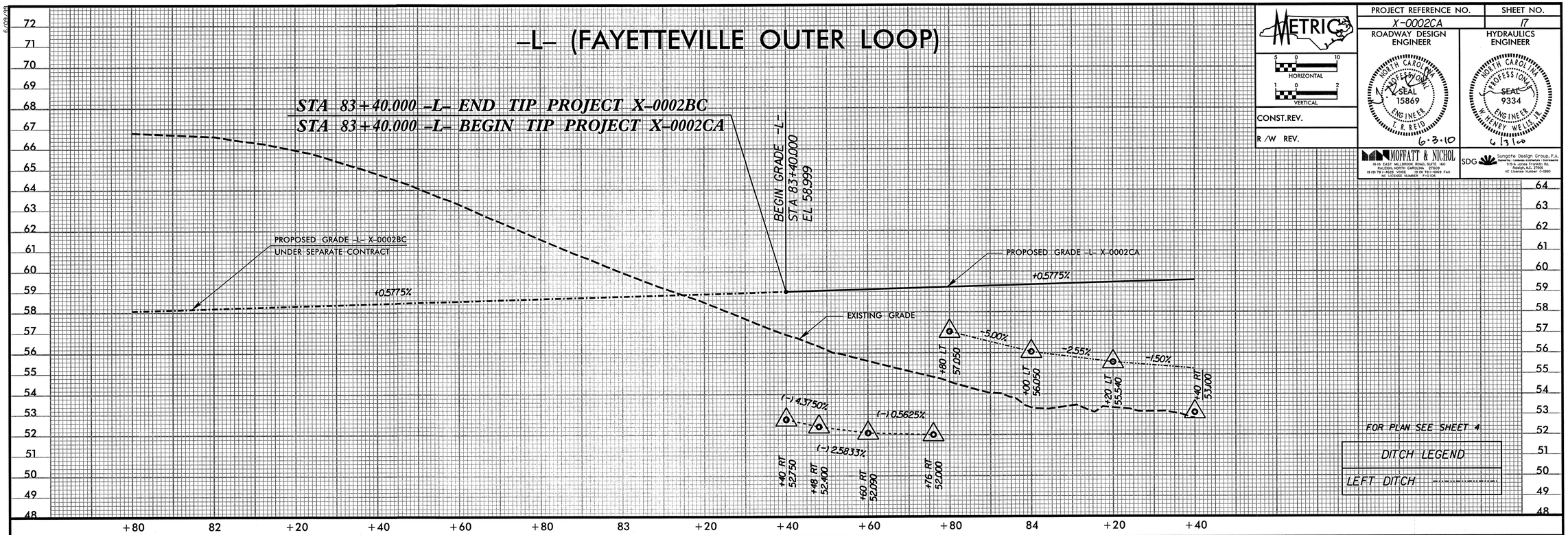
HYDRAULICS ENGINEER

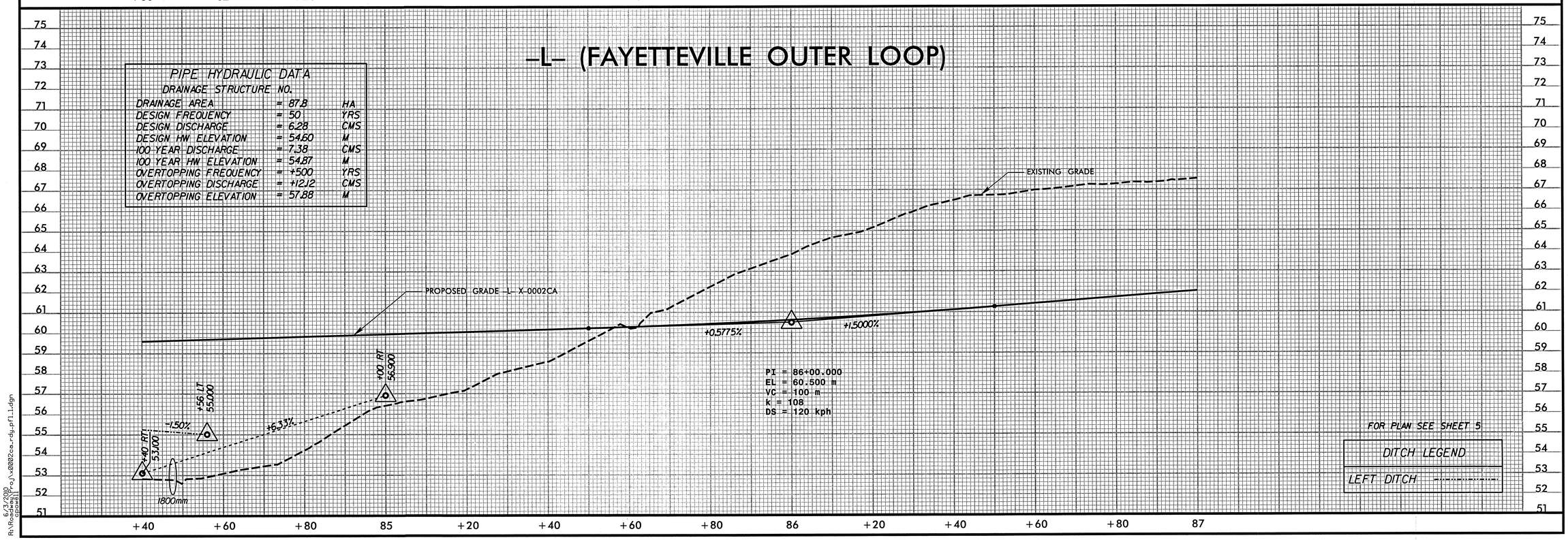
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.

6/3/10

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-6869 FAX
NC LICENSE NUMBER P-0105

SDG Sungate Design Group, P.A.
Engineering • Landscape Architecture • Environmental
9 Bird Jones Franklin Rd.
Raleigh, N.C. 27606
NC License Number C-0890





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PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	18

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

6/3/10

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
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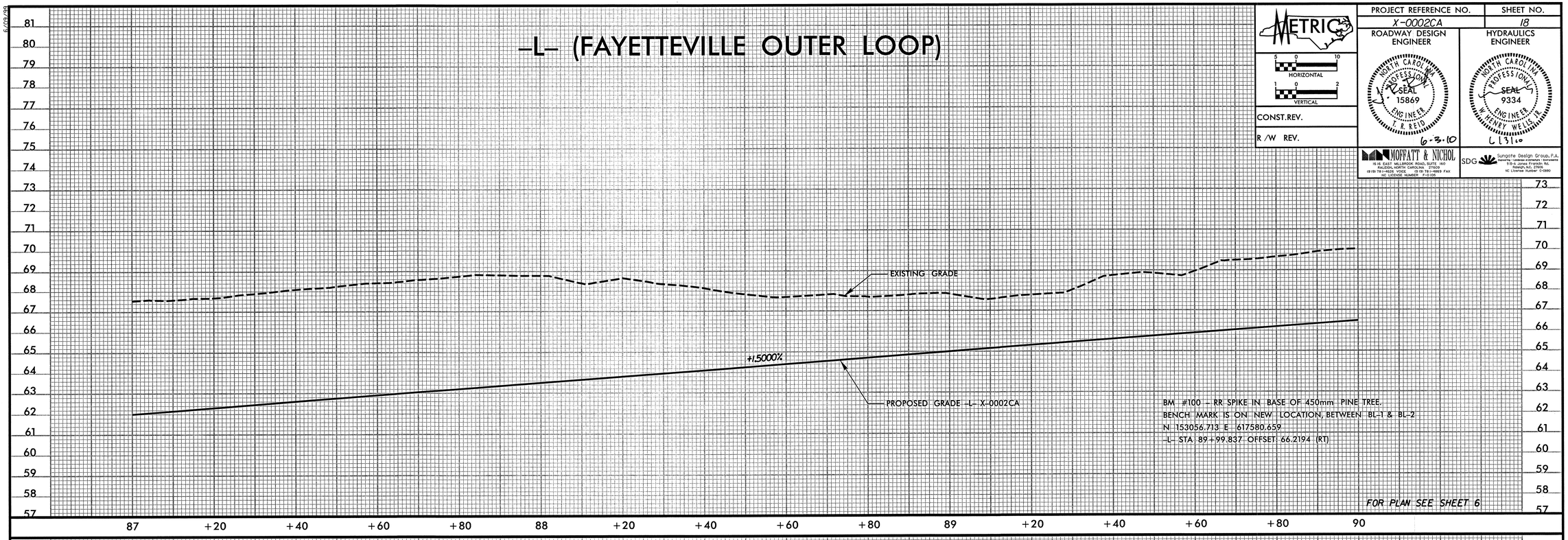
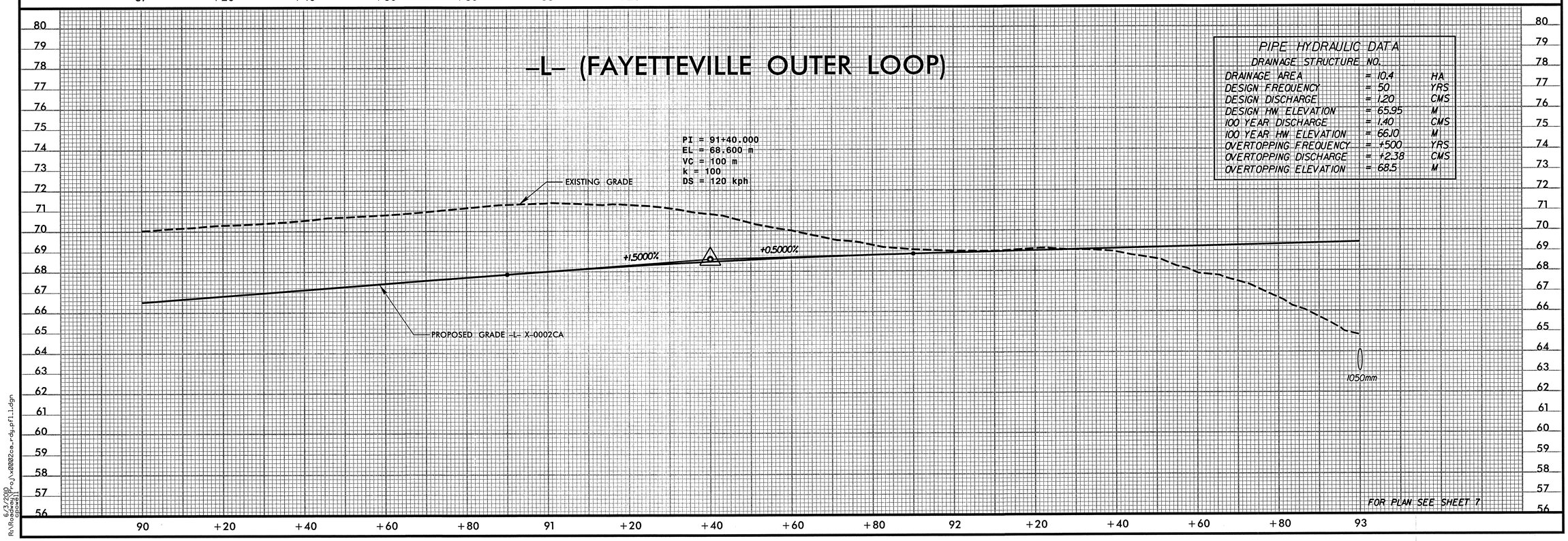
(919) 781-4626 VOICE (919) 781-4869 FAX
NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A.
Planning • Landscape Architecture • Environmental
9 S.A. Jones Franklin Rd.
Raleigh, N.C. 27606
NC License Number C-0890

-L- (FAYETTEVILLE OUTER LOOP)



-L- (FAYETTEVILLE OUTER LOOP)



PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 10.4	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1.20	CMS
DESIGN HW ELEVATION	= 65.95	M
100 YEAR DISCHARGE	= 1.40	CMS
100 YEAR HW ELEVATION	= 66.10	M
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= +2.38	CMS
OVERTOPPING ELEVATION	= 68.5	M

6/3/2010
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PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	19

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

6/3/10

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A.
Transportation Consultants
9104 Jones Franklin Rd.
Raleigh, N.C. 27606
NC License Number C-0890

-L- (FAYETTEVILLE OUTER LOOP)

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

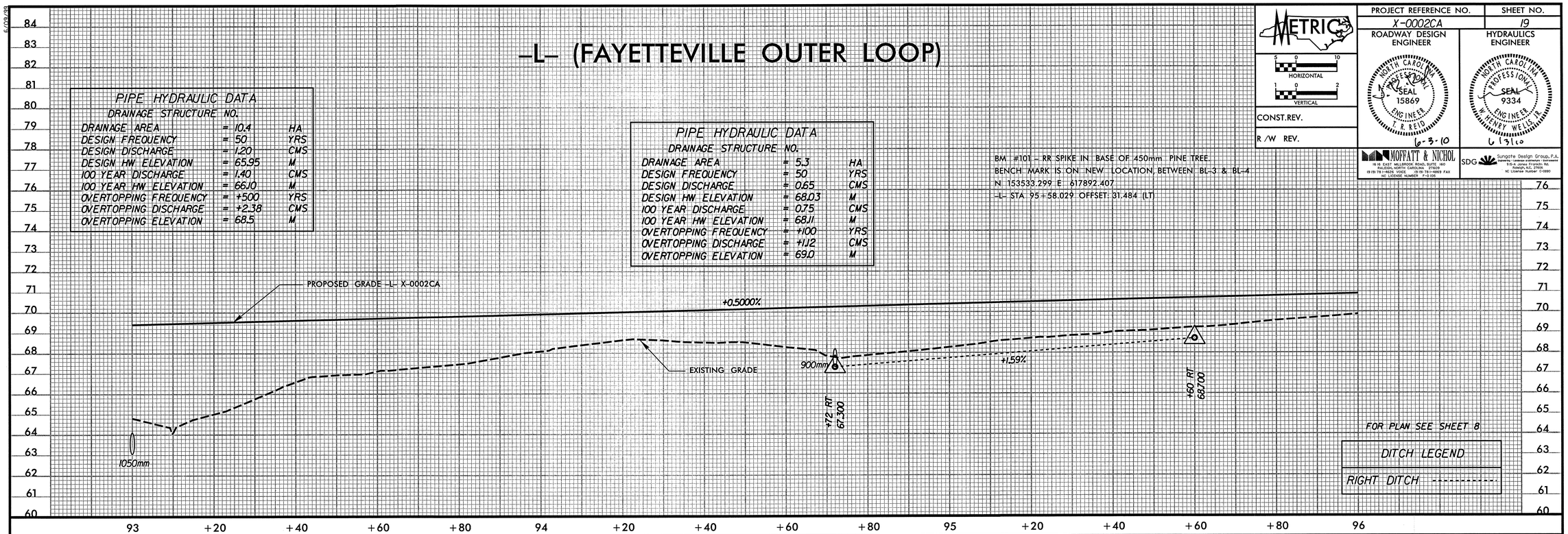
DRAINAGE AREA	= 10.4	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 1.20	CMS
DESIGN HW ELEVATION	= 65.95	M
100 YEAR DISCHARGE	= 1.40	CMS
100 YEAR HW ELEVATION	= 66.10	M
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= +2.38	CMS
OVERTOPPING ELEVATION	= 68.5	M

PIPE HYDRAULIC DATA

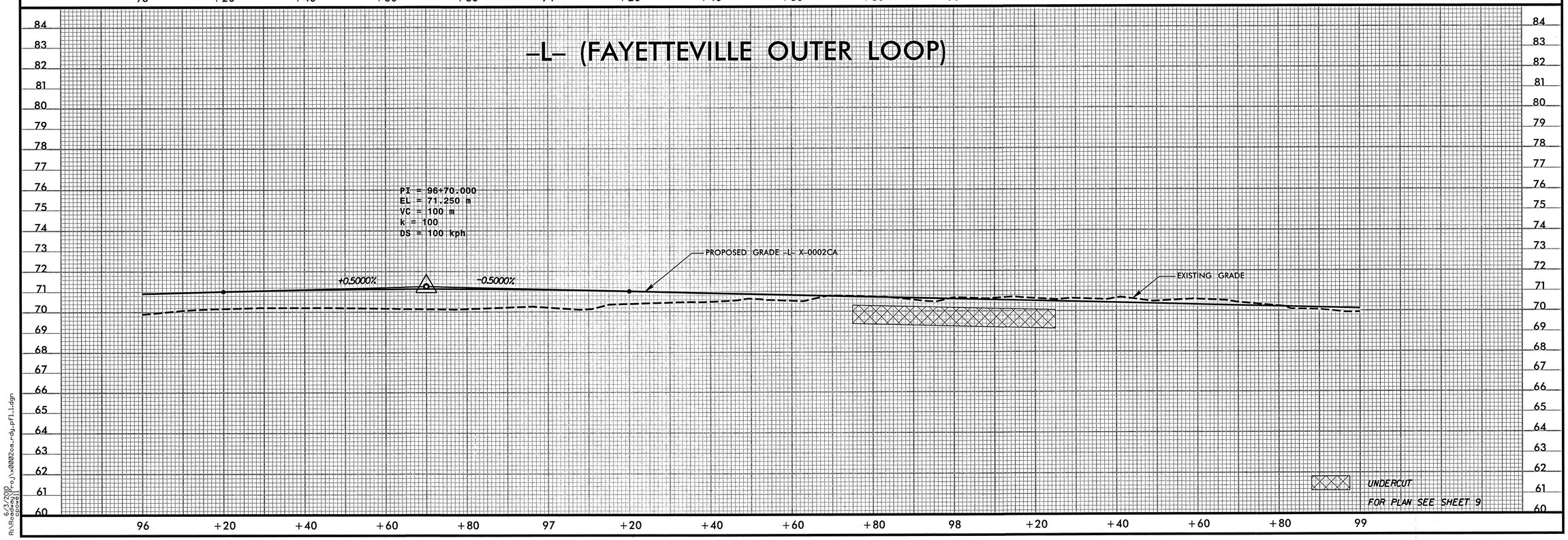
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 5.3	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 0.65	CMS
DESIGN HW ELEVATION	= 68.03	M
100 YEAR DISCHARGE	= 0.75	CMS
100 YEAR HW ELEVATION	= 68.11	M
OVERTOPPING FREQUENCY	= +100	YRS
OVERTOPPING DISCHARGE	= +1.12	CMS
OVERTOPPING ELEVATION	= 69.0	M

BM #101 - RR SPIKE IN BASE OF 450mm PINE TREE.
BENCH MARK IS ON NEW LOCATION, BETWEEN BL-3 & BL-4
N 153533.299 E 617892.407
-L- STA 95+58.029 OFFSET: 31.484 (LT)



-L- (FAYETTEVILLE OUTER LOOP)



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PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	20

ROADWAY DESIGN ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID — 6-3-10

HYDRAULICS ENGINEER — NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR. — 6/3/10

METRIC — HORIZONTAL 5 0 10 — VERTICAL 1 0 2

CONST.REV.

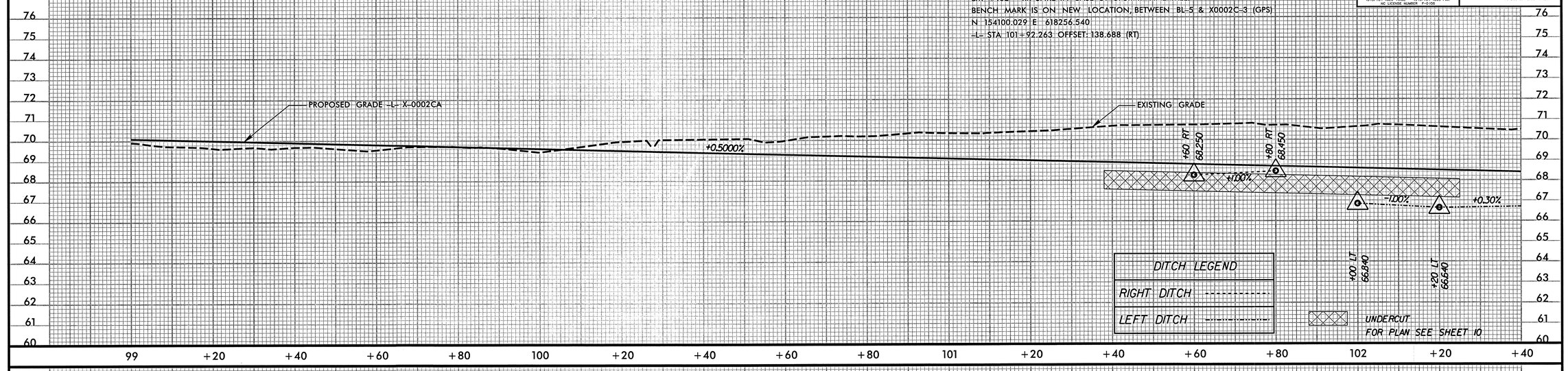
R/W REV.

MOFFATT & NICHOL — 1616 EAST MILLBROOK ROAD, SUITE 160, RALEIGH, NORTH CAROLINA 27609 (919) 781-4626 VOICE (919) 781-4869 FAX NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A. — Transports · Landscape Architecture · Environmental — 915-A Jones Franklin Rd. Raleigh, N.C. 27606 NC License Number C-0890

-L- (FAYETTEVILLE OUTER LOOP)

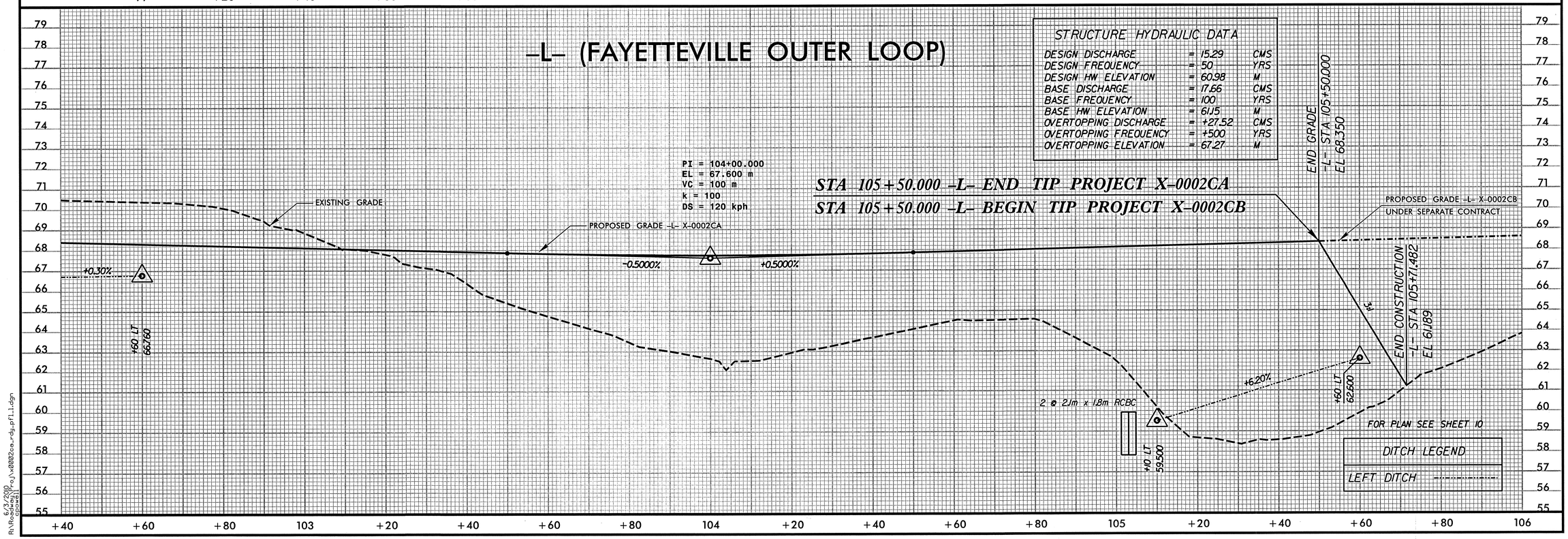
BM #102 – RR SPIKE IN BASE OF 375mm PINE TREE.
BENCH MARK IS ON NEW LOCATION, BETWEEN BL-5 & X0002C-3 (GPS)
N 154100.029 E 618256.540
-L- STA 101+92.263 OFFSET: 138.688 (RT)



-L- (FAYETTEVILLE OUTER LOOP)

STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 15.29	CMS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 60.98	M
BASE DISCHARGE	= 17.66	CMS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 61.15	M
OVERTOPPING DISCHARGE	= +27.52	CMS
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING ELEVATION	= 67.27	M



6/09/99

6/3/2010
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cpowell

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	21

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

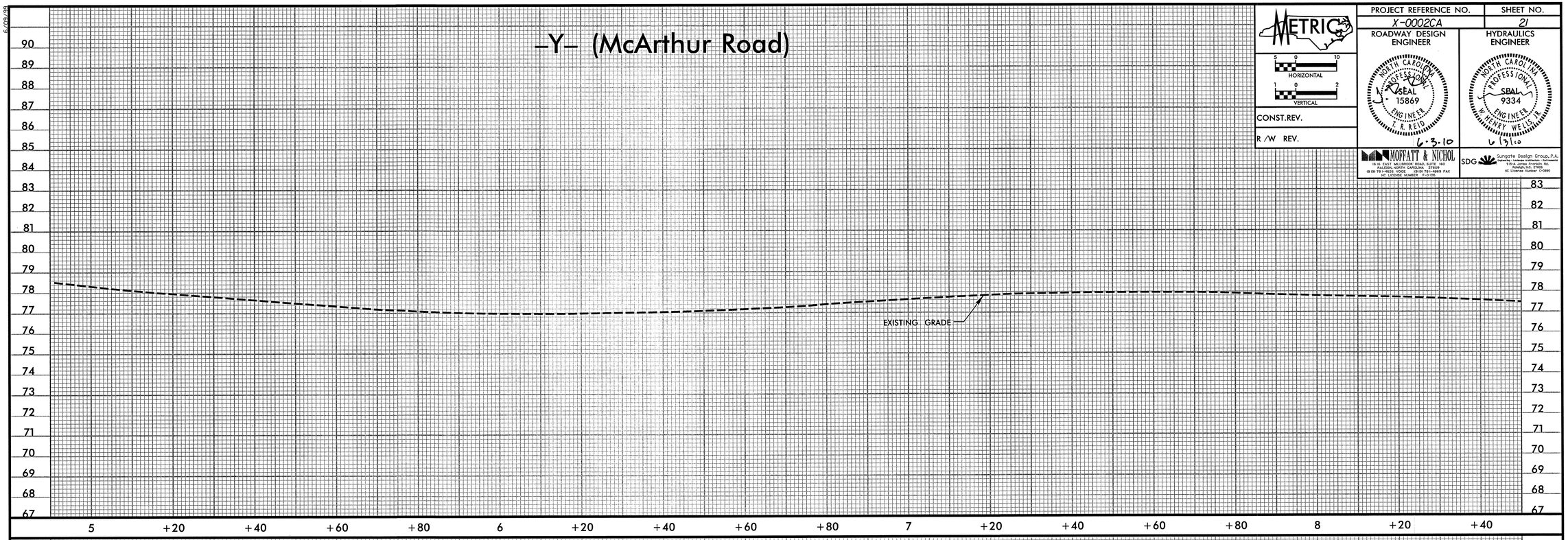
HYDRAULICS ENGINEER

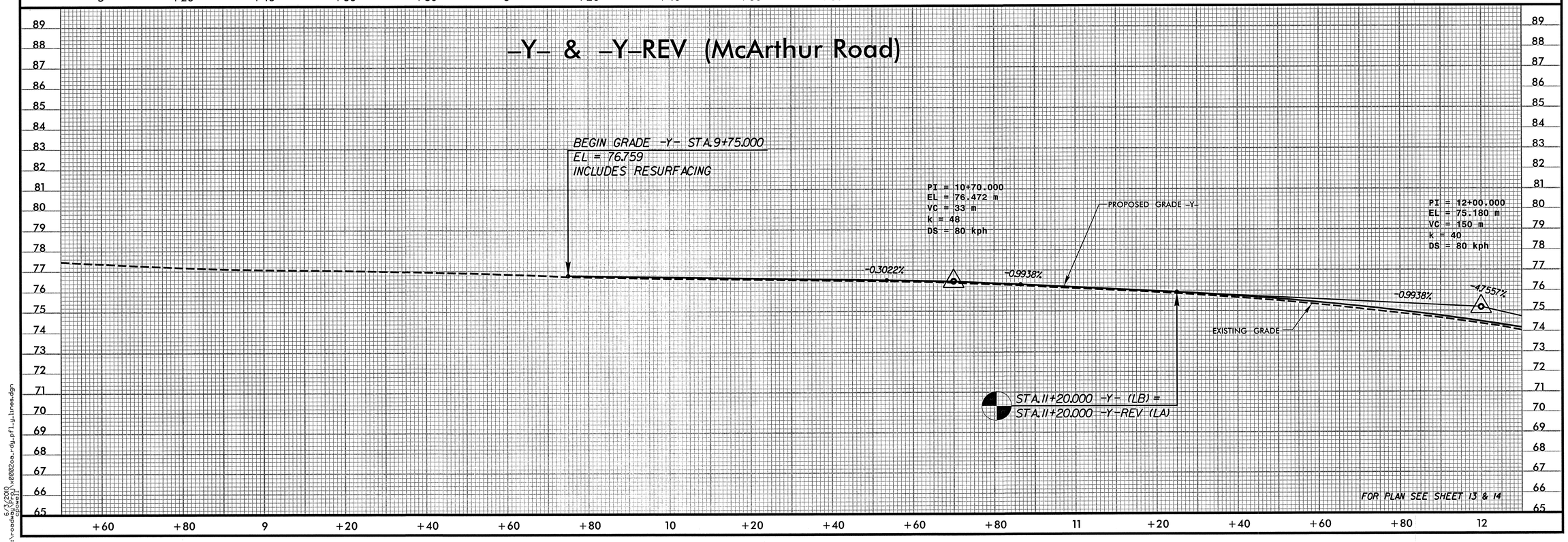
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR.

6/3/10

MOFFATT & NICHOL
16 16 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A.
Engineers • Landscape Architects • Environmental
9 Sixth Avenue Franklin Rd.
Raleigh, N.C. 27605
NC License Number C-0890





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cpowell

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	22

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R/W REV.

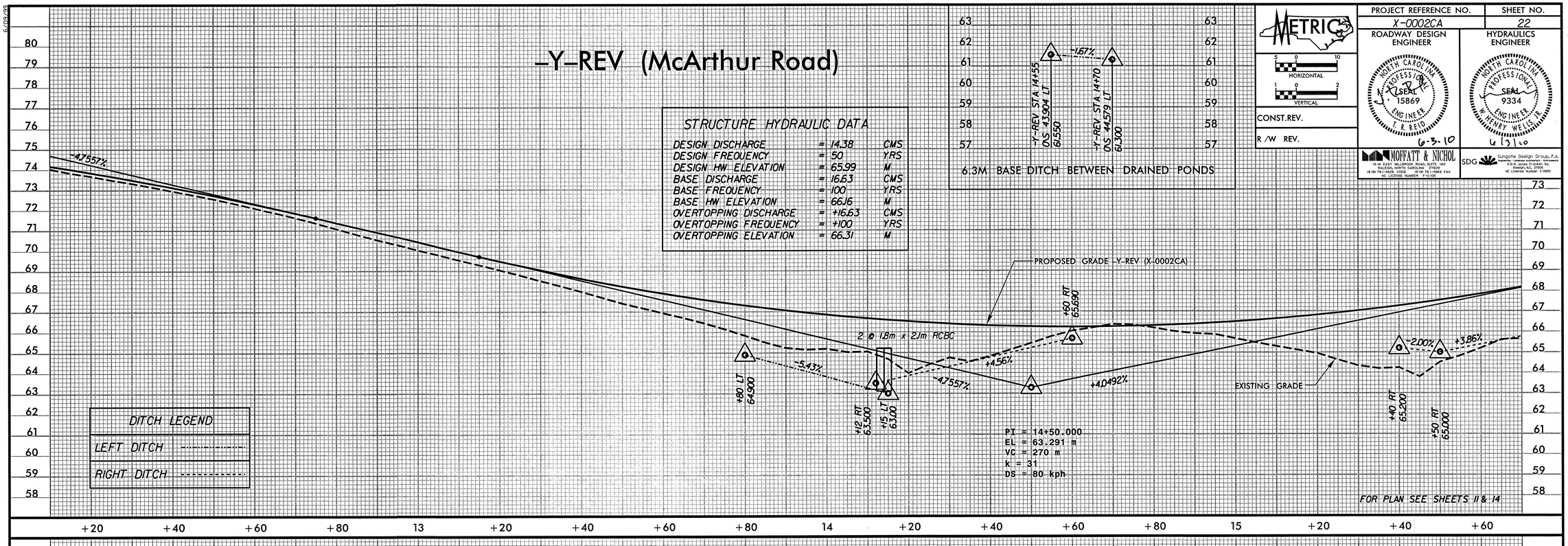
ROADWAY DESIGN ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID 6-3-10

HYDRAULICS ENGINEER: NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS JR. 6/3/10

MOFFATT & NICHOL 16-16 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 781-4626 VOICE (919) 781-4869 FAX NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A. 915-A Jones Franklin Rd. Raleigh, N.C. 27606 NC License Number C-0890

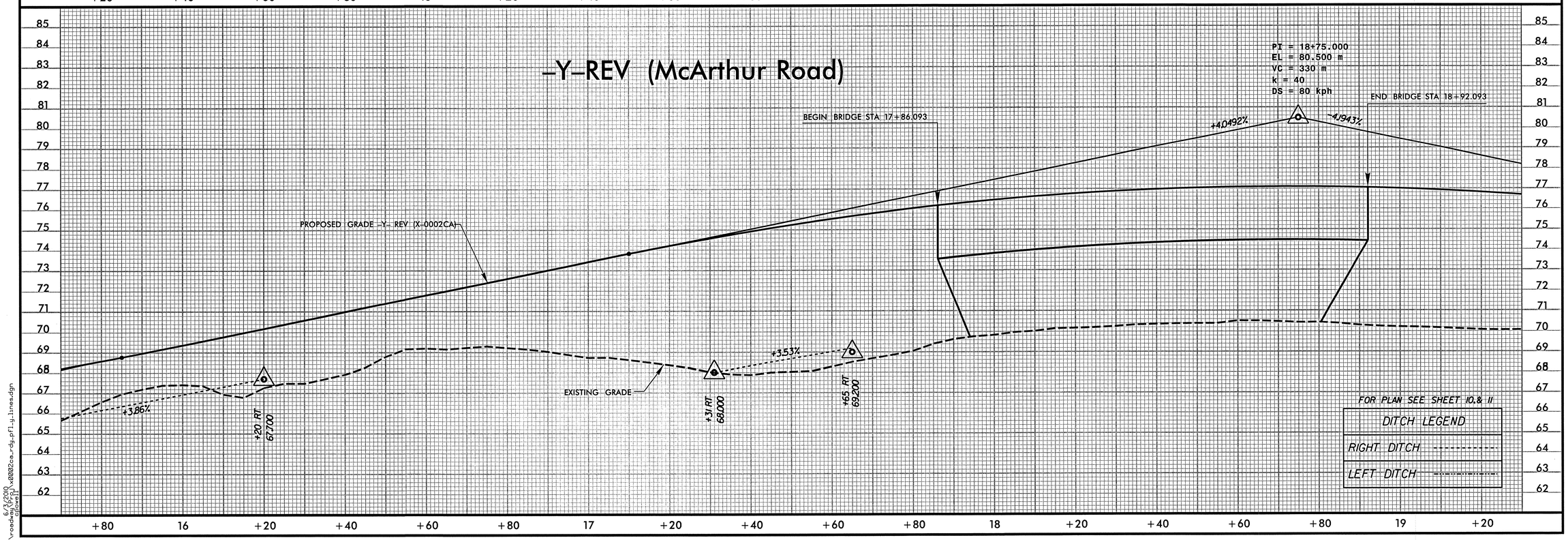
-Y-REV (McArthur Road)



STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 14.38	CMS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 65.99	M
BASE DISCHARGE	= 16.63	CMS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 66.16	M
OVERTOPPING DISCHARGE	= +16.63	CMS
OVERTOPPING FREQUENCY	= +100	YRS
OVERTOPPING ELEVATION	= 66.31	M

-Y-REV (McArthur Road)



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PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	23

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID 6.3.10

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR. 6/3/10

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

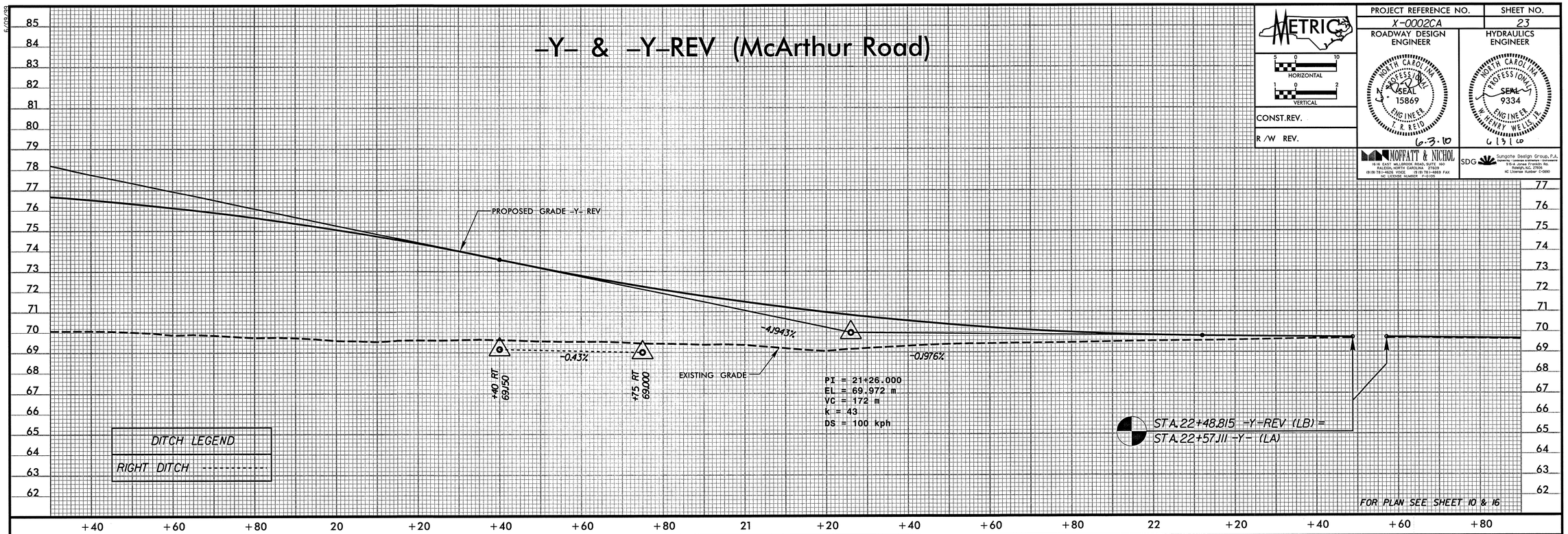
CONST.REV.

R/W REV.

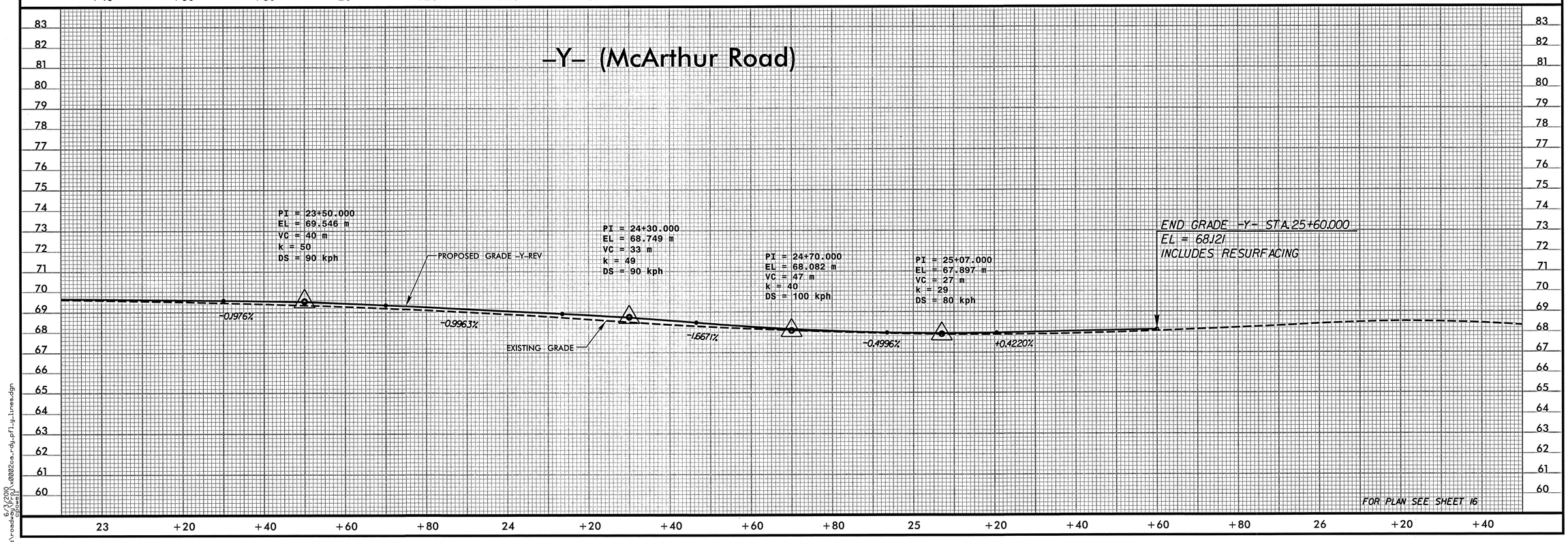
MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4685 FAX
NC LICENSE NUMBER F-0-105

SDG Sungate Design Group, P.A.
Transportation Engineers
516-A James Franklin Rd.
Raleigh, N.C. 27606
NC License Number C-0910

-Y- & -Y-REV (McArthur Road)



-Y- (McArthur Road)



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PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	24

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

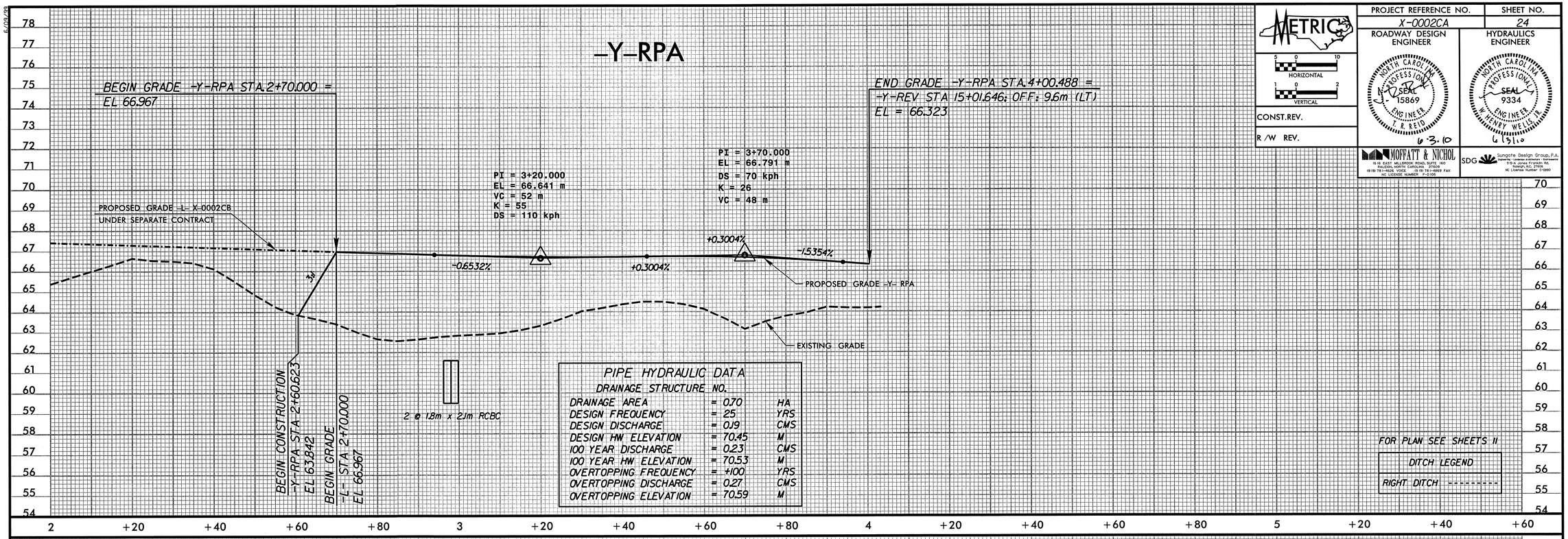
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

6/3/10

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A.
Diamond Lawrence Hardware Bldg.
915-A Jones Franklin Rd.
Raleigh, N.C. 27606
NC License Number C-0890



PIPE HYDRAULIC DATA

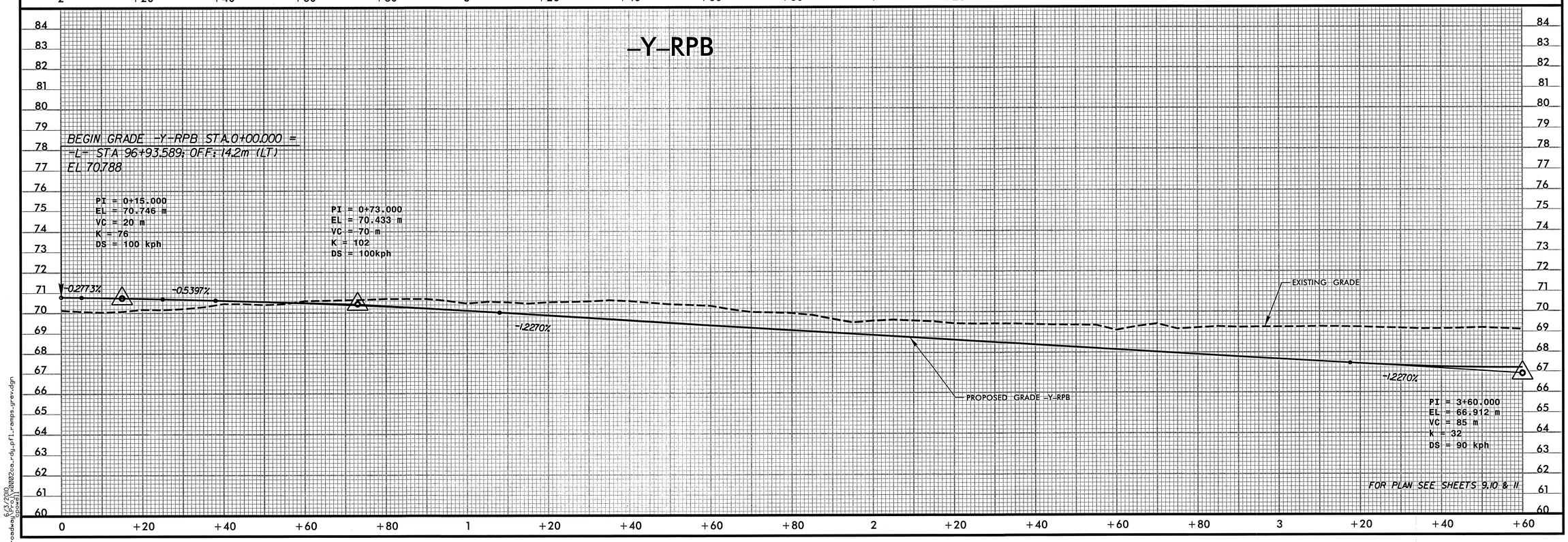
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 0.70	HA
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 0.19	CMS
DESIGN HW ELEVATION	= 70.45	M
100 YEAR DISCHARGE	= 0.23	CMS
100 YEAR HW ELEVATION	= 70.53	M
OVERTOPPING FREQUENCY	= +100	YRS
OVERTOPPING DISCHARGE	= 0.27	CMS
OVERTOPPING ELEVATION	= 70.59	M

FOR PLAN SEE SHEETS 11

DITCH LEGEND

RIGHT DITCH ---------



FOR PLAN SEE SHEETS 9,10 & 11

6/09/99

6/3/2010
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opowell

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	25

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

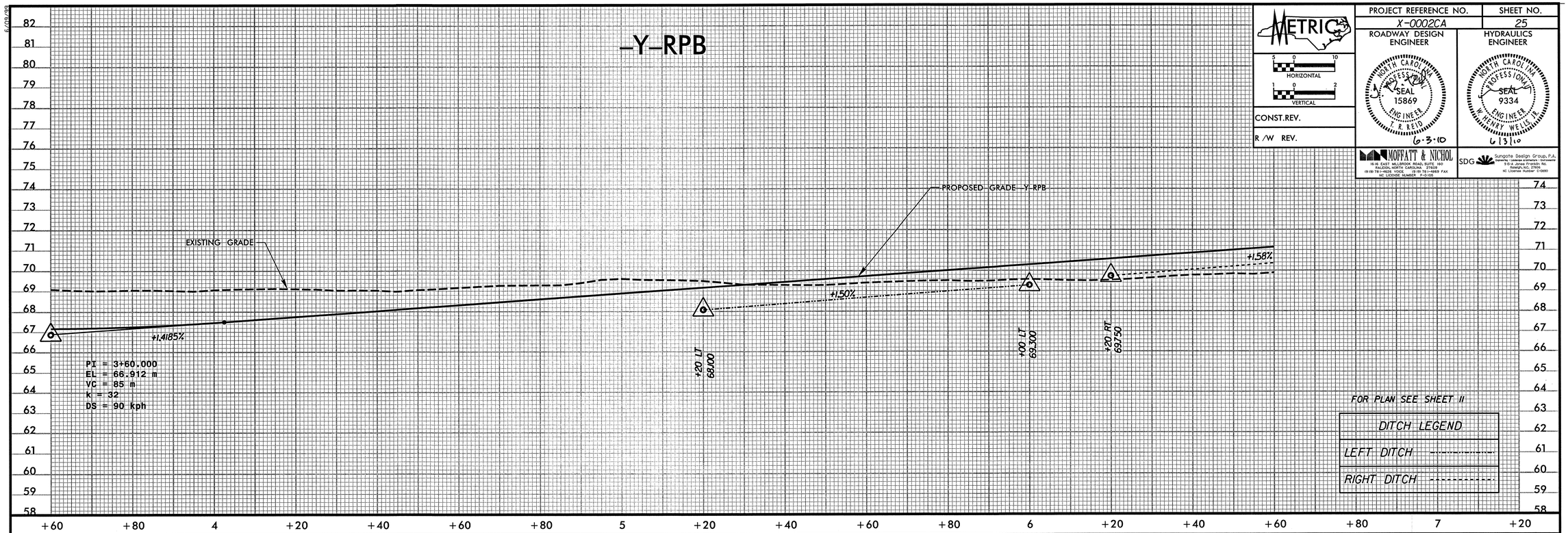
HYDRAULICS ENGINEER

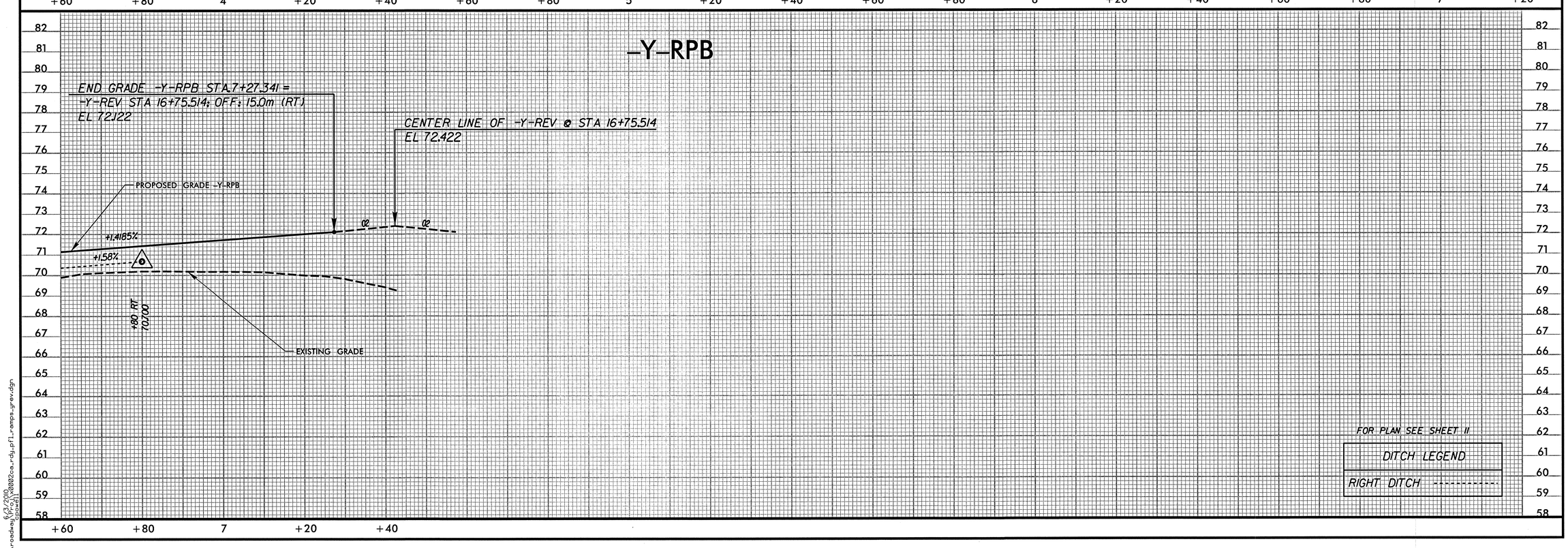
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

6/3/10

MOFFATT & NICHOL
16-16 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A.
Planning • Landscape Architecture • Environmental
915-A Jones Franklin Rd.
Raleigh, N.C. 27606
NC License Number C-0890





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cpowell

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	26

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

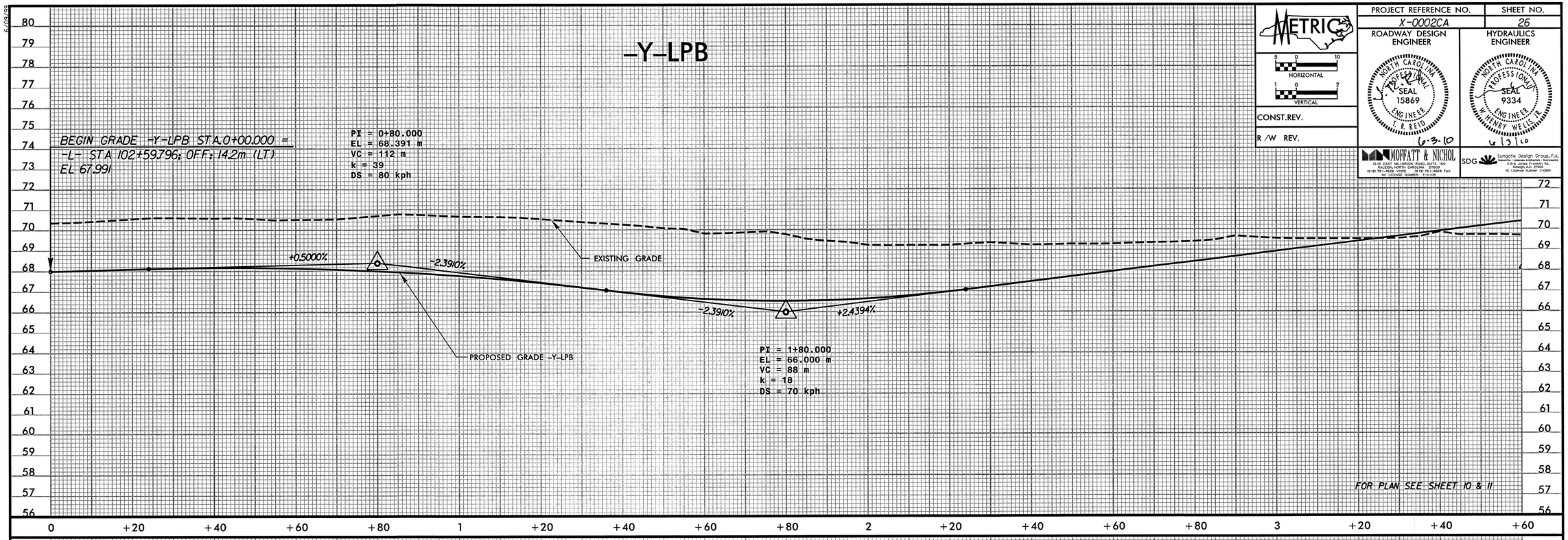
HYDRAULICS ENGINEER

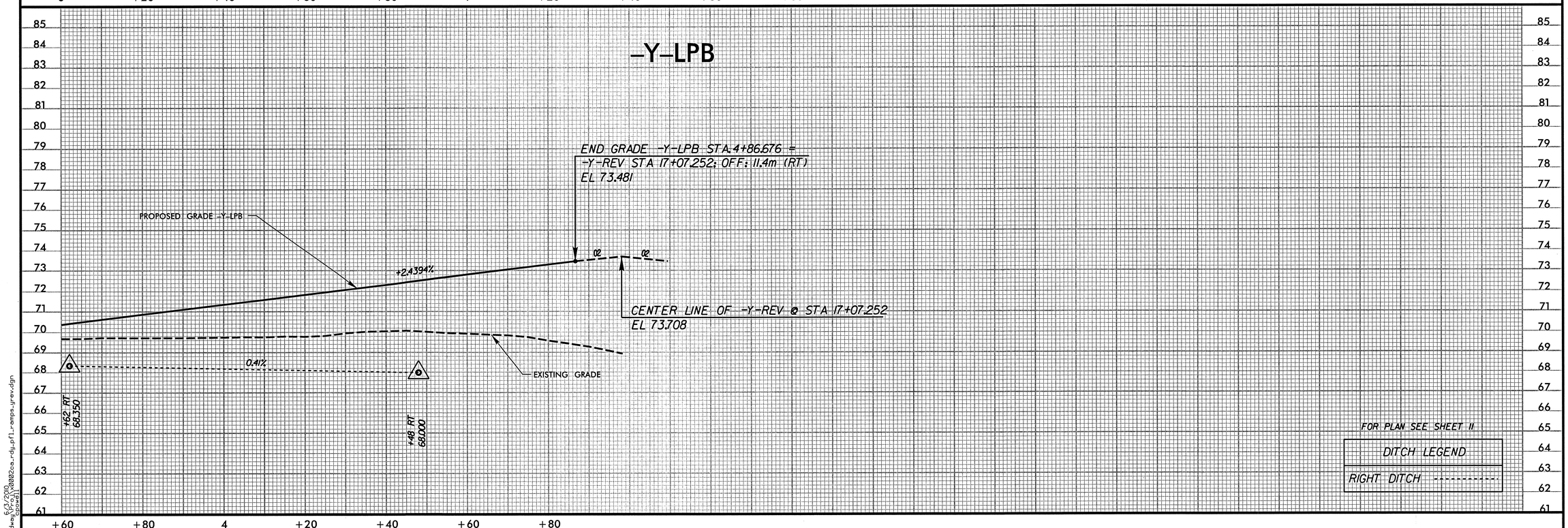
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

6/3/10

MOFFATT & NICHOL
16-16 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4869 FAX
NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A.
Planning • Landscape Architecture • Environmental
9 St. A. Jones Frontage Rd.
Raleigh, N.C. 27606
NC License Number C-0890





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cpowell

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	27

METRIC

5 0 10 HORIZONTAL

1 0 2 VERTICAL

CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER R. REID

6-3-10

HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, III

6/3/10

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4865 FAX
NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A.
Planners · Landscape Architects · Engineers
915-A Jones Franklin Rd.
Raleigh, N.C. 27606
NC License Number C-0290

-Y-RPC

BEGIN GRADE -Y-RPC STA.0+00.000 =
-L- STA 97+20.000; OFF: 17.8m (RT)
EL = 71.464

PI = 0+51.000
EL = 71.323 m
VC = 23 m
k = 158
DS = 120 kph

PI = 1+80.000
EL = 70.780 m
VC = 30 m
k = 41
DS = 100 kph

PI = 3+40.000
EL = 71.276 m
VC = 60 m
k = 50
DS = 80 kph

-0.2757%
-0.4212%
-0.4212%
-0.30%
+0.3100%
+0.3100%
-0.8909%

PROPOSED GRADE -Y-RPC

EXISTING GRADE

+62 RT
69.560

+82 RT
69.500

FOR PLAN SEE SHEET 9 & 10

DITCH LEGEND

RIGHT DITCH

-Y-RPC

END GRADE -Y-RPC STA.5+06.732 =
-Y-REV STA 21+83.785; OFF: 8.0m (RT)
EL = 69.791

PROPOSED GRADE -Y-RPC

-0.8909%

-0.33%

600mm

EXISTING GRADE

+80 LT
69.000

+10 LT
69.000

PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 1.75	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 0.43	CMS
DESIGN HW ELEVATION	= 69.70	M
100 YEAR DISCHARGE	= 0.46	CMS
100 YEAR HW ELEVATION	= 69.75	M
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= +0.46	CMS
OVERTOPPING ELEVATION	= 70.2	M

FOR PLAN SEE SHEET 10

DITCH LEGEND

LEFT DITCH

6/03/2010
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PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	28

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

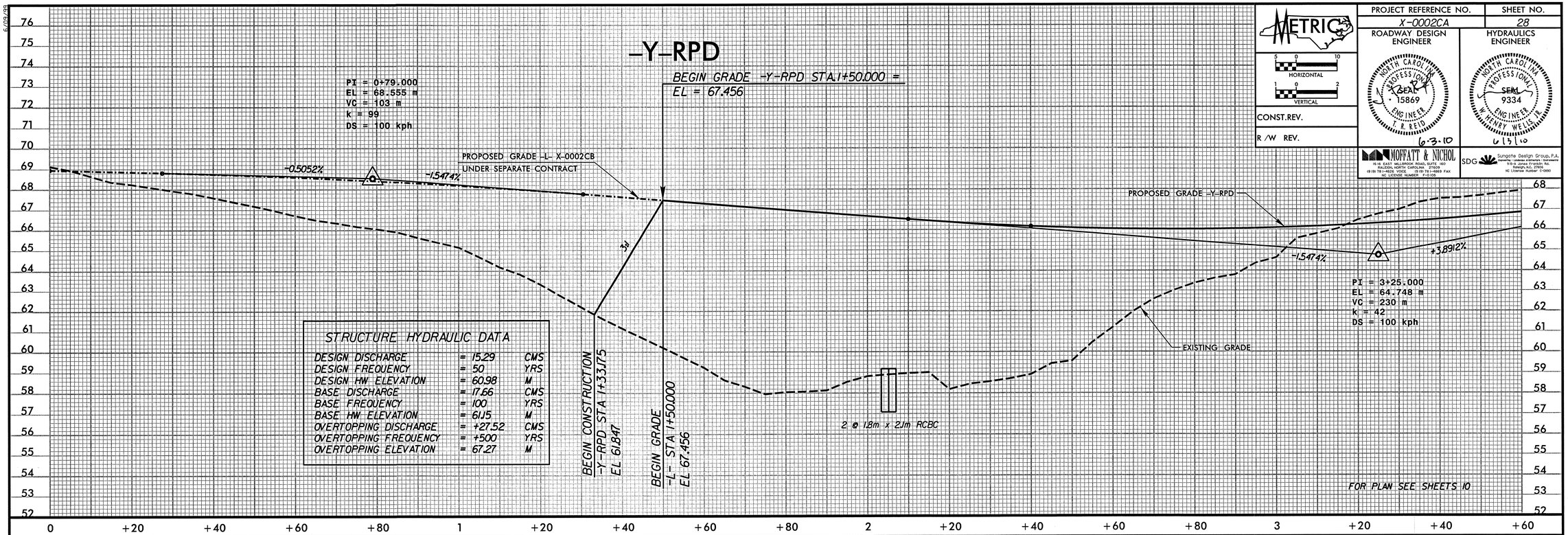
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

6/3/10

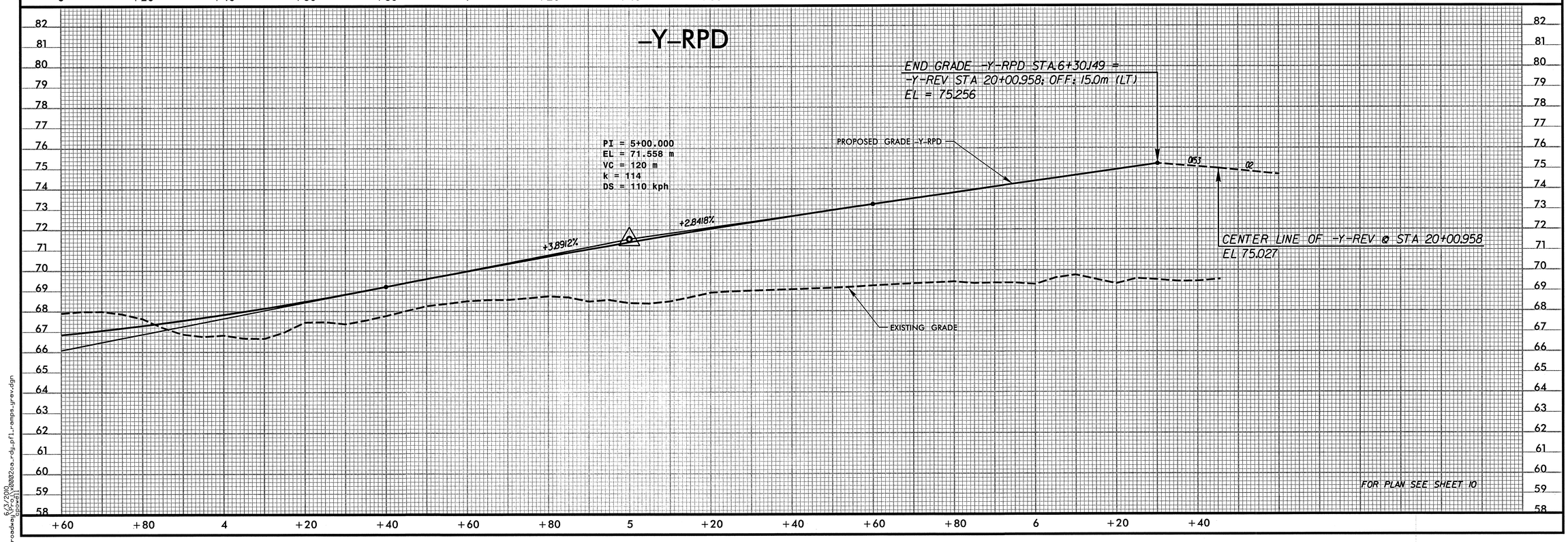
MOFFATT & NICHOL
16-18 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4669 FAX
NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A.
Planning • Landscape Architecture • Environmental
915-A Jones Franklin Rd.
Raleigh, N.C. 27606
NC License Number C-0890



STRUCTURE HYDRAULIC DATA

DESIGN DISCHARGE	= 15.29	CMS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 60.98	M
BASE DISCHARGE	= 17.66	CMS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 61.15	M
OVERTOPPING DISCHARGE	= +27.52	CMS
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING ELEVATION	= 67.27	M



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opowell

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	29

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R /W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

HYDRAULICS ENGINEER

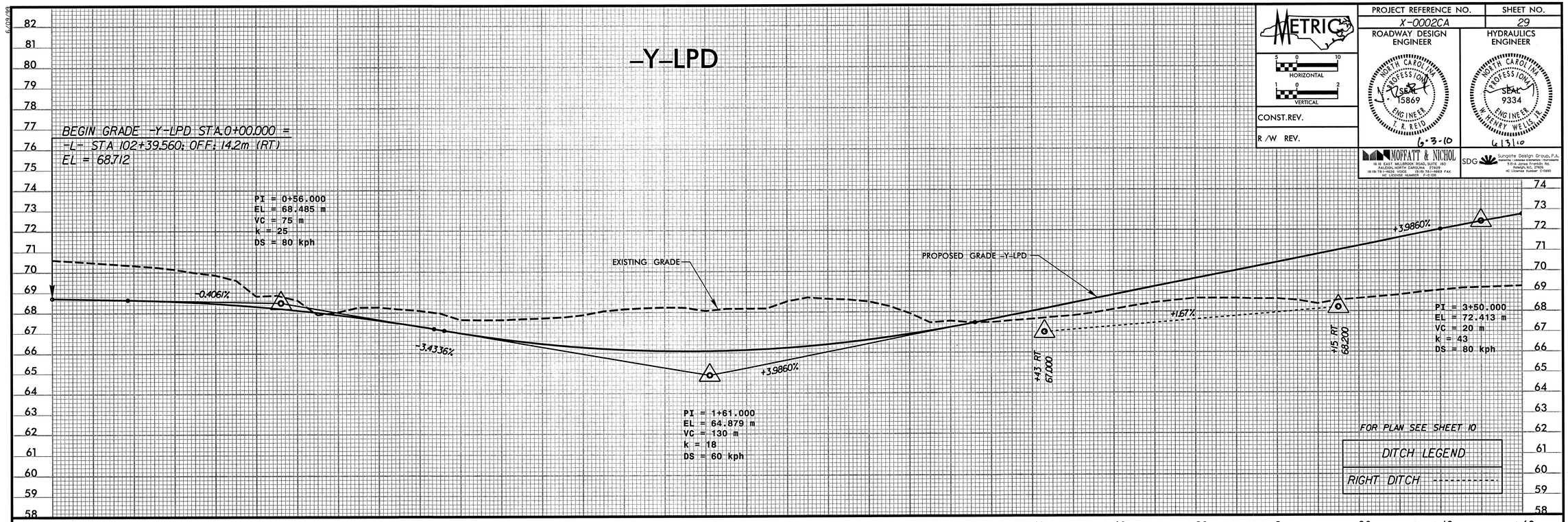
NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

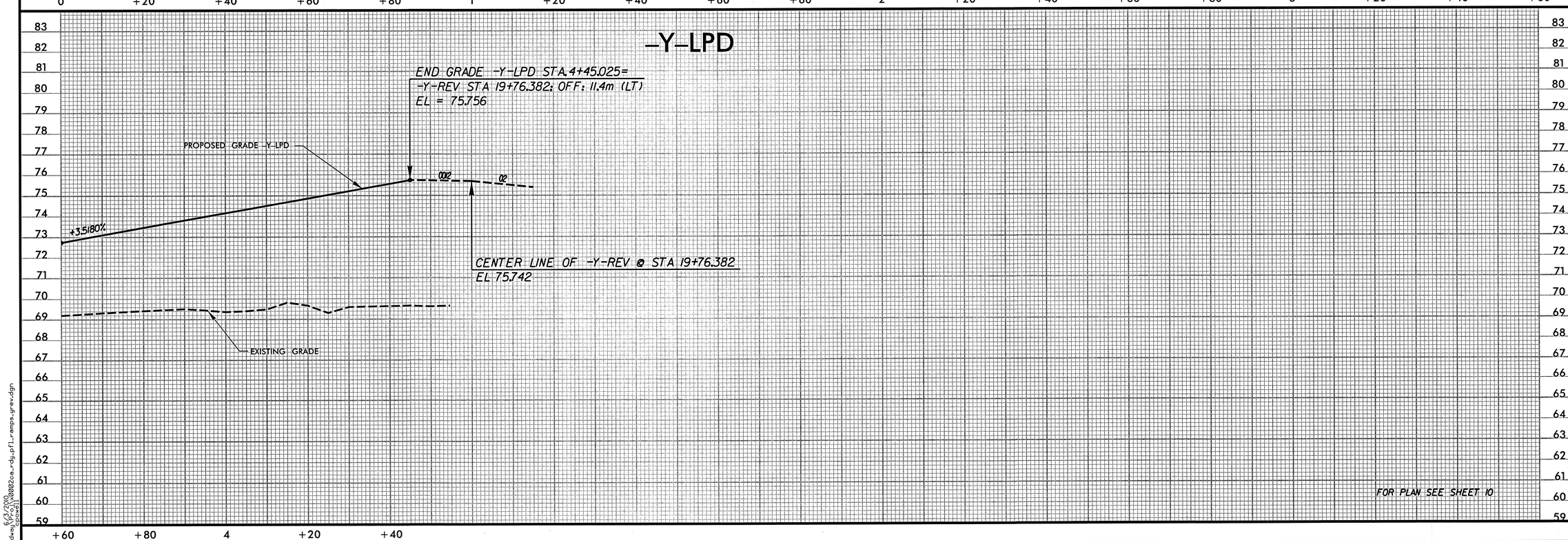
6/3/10

MOFFATT & NICHOL

16 16 EAST MILLBROOK ROAD, SUITE 160 RALEIGH, NORTH CAROLINA 27609 (919) 781-4626 VOICE (919) 781-4869 FAX NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A. Engineering | Licensed Engineering | Environmental 915-A Jones Franklin Rd. Raleigh, N.C. 27606 NC License Number C-0890





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PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	30

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R /W REV.

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER R. REID 6-3-10

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR. 6/3/10

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4685 FAX
NC LICENSE NUMBER F-0105

SDG Sungate Design Group, P.A.
Transportation Consultants
810-A James Franklin Rd.
Raleigh, N.C. 27606
NC License Number C-0980

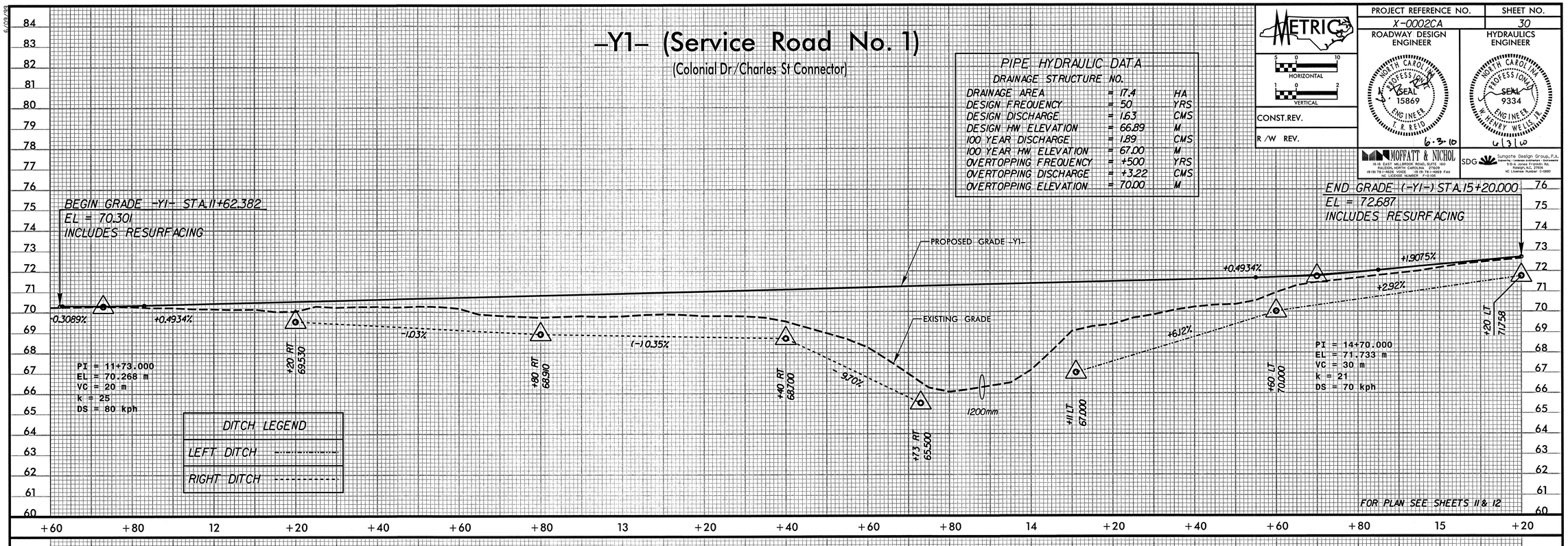
-Y1- (Service Road No. 1)

(Colonial Dr./Charles St Connector)

PIPE HYDRAULIC DATA

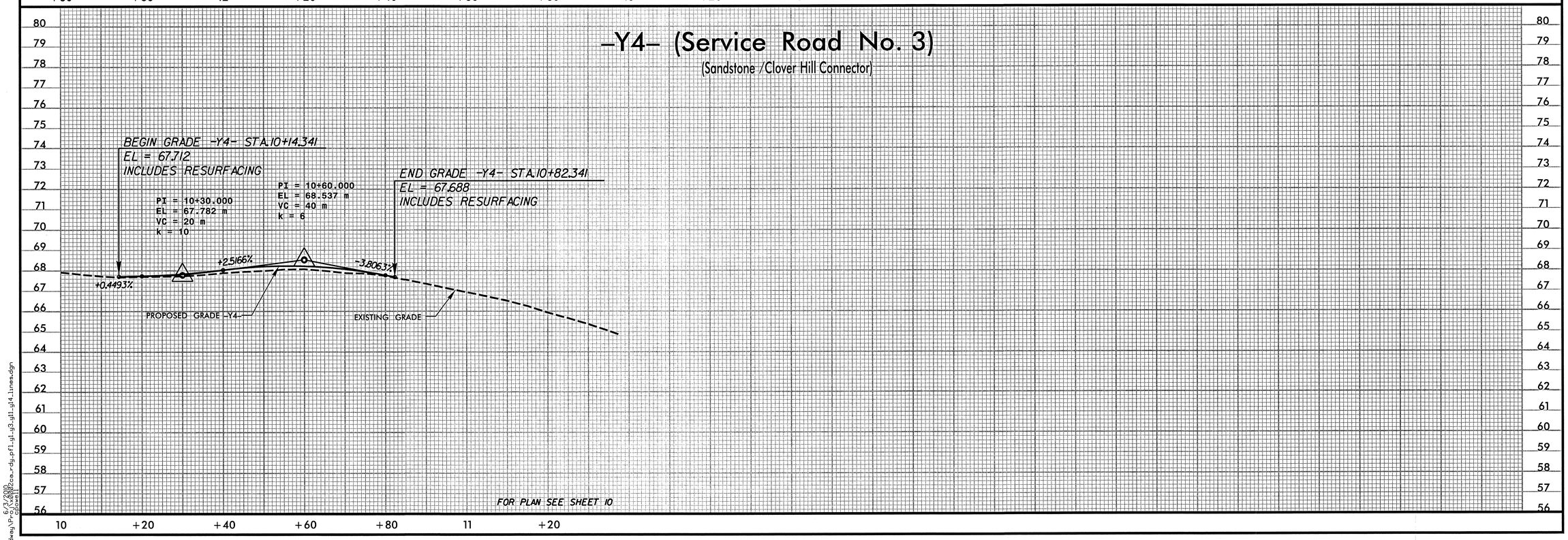
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 17.4	HA
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 16.3	CMS
DESIGN HW ELEVATION	= 66.89	M
100 YEAR DISCHARGE	= 18.9	CMS
100 YEAR HW ELEVATION	= 67.00	M
OVERTOPPING FREQUENCY	= +500	YRS
OVERTOPPING DISCHARGE	= +3.22	CMS
OVERTOPPING ELEVATION	= 70.00	M



-Y4- (Service Road No. 3)

(Sandstone / Clover Hill Connector)



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cjones

PROJECT REFERENCE NO.	SHEET NO.
X-0002CA	31

METRIC

HORIZONTAL 5 0 10

VERTICAL 1 0 2

CONST.REV.

R/W REV.

ROADWAY DESIGN ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 15869 ENGINEER T. R. REID

6-3-10

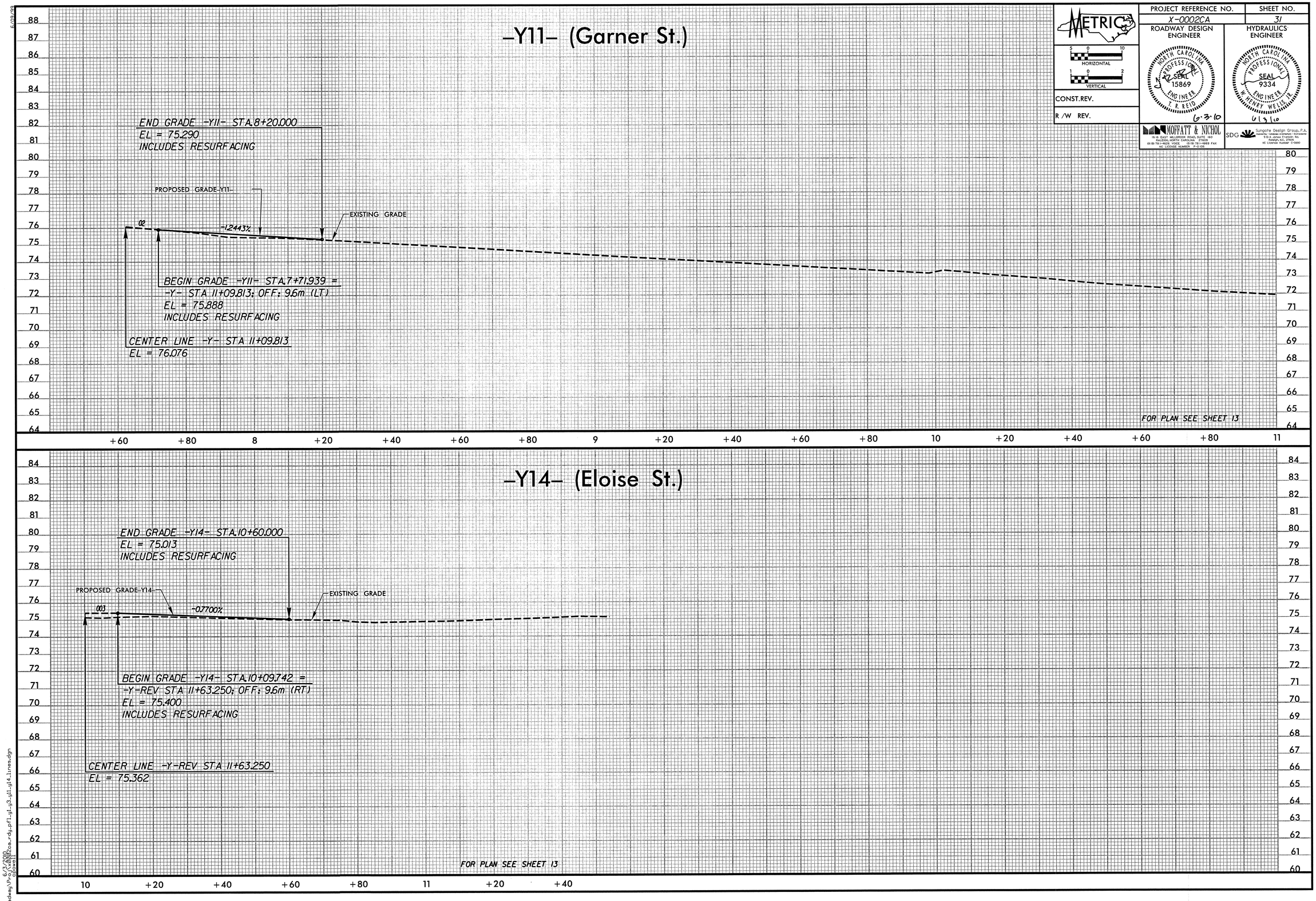
HYDRAULICS ENGINEER

NORTH CAROLINA PROFESSIONAL SEAL 9334 ENGINEER W. HENRY WELLS, JR.

6/3/10

MOFFATT & NICHOL
1616 EAST MILLBROOK ROAD, SUITE 160
RALEIGH, NORTH CAROLINA 27609
(919) 781-4626 VOICE (919) 781-4669 FAX
NC LICENSE NUMBER P-0105

SDG Sungate Design Group, P.A.
Planning • Landscape Architecture • Environmental
9 Sir-A James Franklin Rd.
Raleigh, N.C. 27606
NC License Number C-0890



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6/3/2010
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